YOUR NATIONAL PARKS

ENOS A. MILLS

REFERENCE LIBRARY * HOUGHTON MIFFLIN CO. * BOSTON, MASS.
Archive
Collection

This book may not leave the Offices
and if borrowed must be returned within 7 days

By Enos A. Mills

YOUR NATIONAL PARKS. Illustrated.
THE STORY OF SCOTCH. Illustrated.
THE ROCKY MOUNTAIN WONDERLAND. Illustrated.
THE STORY OF A THOUSAND-YEAR PINE. Illustrated.
IN BEAVER WORLD. Illustrated.
THE SPELL OF THE ROCKIES. Illustrated.
WILD LIFE ON THE ROCKIES. Illustrated.

HOUGHTON MIFFLIN COMPANY
BOSTON AND NEW YORK

YOUR NATIONAL PARKS

JOHN COLTER, THE DISCOVERER OF YELLOWSTONE PARK

YOUR NATIONAL PARKS

BY

ENOS A. MILLS

With Illustrations

BOSTON AND NEW YORK

HOUGHTON MIFFLIN COMPANY

The Riverside Press Cambridge

1920

COPYRIGHT, 1917, BY ENOS A. MILLS

ALL RIGHTS RESERVED

Published June 1917

TO

GEORGE W. PERKINS

AND

WILLIAM A. WELCH

WHOSE STATESMANSHIP, ENERGY, IDEALS, AND COURAGE
ARE MAKING THE PALISADES INTER-STATE PARK
"THE GREATEST PARK IN THE WORLD"

PREFACE

St. Louis had a memorable "flag day" a little more than a century ago. Within twenty-four hours the yellow and red flag of Spain was run down and the tricolor run up; this hauled down and the Stars and Stripes run up. The Louisiana Territory thus became a part of the United States. In a flash, the western boundary of this country was changed from the Mississippi River to the Rocky Mountains.

Scarcely were the Stars and Stripes flying, before Lewis and Clark were on their way to explore the vast and mysterious Louisiana Territory — the West. Theirs was one of the most comprehensive and successful exploring expeditions on record — one of the greatest of outdoor expeditions. There were adventures and hardships, but after two years the party returned to civilization with the loss of only

one man. The resources of the great West were definitely placed before the world.

This expedition revealed the extraordinary resourcefulness of Lewis and Clark and brought out also two other characters who are worthy of a place in American literature and whose achievements might well be a source of inspiration in American life. These are John Colter, who afterwards discovered the Yellowstone, and Sacagawea, the "bird woman." Sacagawea was the one woman of the Lewis and Clark expedition. She rendered remarkable service, and her name will be forever associated with exploration, with woodcraft, and with the National-Park wildernesses.

Just before the returning Lewis and Clark expedition reached St. Louis, it met trappers starting up the river — going into the great West. This was the real beginning of the trapping industry, which for nearly two generations was the dominating influence of the West.

The West was thoroughly explored by

the trappers. In a number of States they formed the first permanent settlement. The trappers harvested the furs of lakes and streams throughout the mountains and built up the "Commerce of the Prairies." We are indebted to them for the Oregon and Santa Fé trails. All history shows no more picturesque or resourceful character than the trapper. Among them were such great men as John Colter, James Bridger, and Kit Carson.

The trapper was followed by the prospector. The trapper did not search for gold. The prospector did not look for furs or fertile lands. In a different way the prospector exploited the same territory as the trapper and thus placed the resources and the romance of the West before the public.

Closely following the trapper and prospector was that rugged and aggressive character, the cowboy. He had a definite part in the forward movement of the frontier. The cowboy cared nothing for furs, or

gold, or fertile lands. He was interested in the rich grasses for his cattle. He, too, had his short day. These characters — the cowboy, the prospector, and the trapper — tarried for a brief moment on the frontier when the farmer, the first lasting settler, arrived. All these armed and vigorous people, the wearers of buckskin, were people of individuality and power. They made great changes throughout the West, and hastened its final development.

Pioneer men and women are among the great and influential figures in history. They were human, they were honorable, and we do honor them. They did not want or need sympathy. They were getting much, perhaps the most, from life; they were happy. We think of theirs as being a life of sacrifice, but it really was a life of selection. They were away from the crowd — from the enemies of sincerity and individuality. Of all people they were most nearly free. But the pioneers are gone.

The frontier no longer exists, and the

days of the wilderness are gone forever. Yet, in our magnificent National Parks we still have a bit of the primeval world and the spirit of the vigorous frontier. In these wild parks we may rebuild the past, and in them the trapper, the prospector, the cowboy, and the pioneer may act once more their part in the scenes that knew them.

These wilderness empires of our National Parks have been snatched from leveling forces of development. They are likely to prove the richest, noblest heritage of the nation. Here the world is at play, here are scenes ever new and that will greatly help to keep the nation young.

In the words of John Dickinson Sherman: "It is as if Nature in these places had in self-defense devoted all her energies to scenery, proclaiming to the nation, 'Here I will make playgrounds for the people. Here is nothing for commerce or industry. Here is natural beauty at its wildest and best. Elsewhere man must live by the

sweat of his brow. Here let him rest and play. Here I will rule supreme for all time.'"

There are seventeen National Parks. New ones will early be made and there are at least twenty other scenic regions which should at once be added. No nation has ever fallen for having too much scenery. Scenery is, indeed, one of our most valuable resources, and these Parks will enable us to build up a scenic industry of magnitude. Already they are being developed with roads and trails, and before long there will be in all of them hotels and camps for visitors of every taste, together with special camps and provision for school-children.

I have tried to describe a few of the wonders of the Parks and to suggest the larger, fuller use of them. Through most of the Parks described I have had happy excursions afoot, alone and unarmed. Not only do the Parks contain some of the world's sublimest and most beautiful scenes, but

each Park is a wild-life reservation, a place where guns are forbidden. Thus protected, these wildernesses will remain forever wild, forever mysterious and primeval, holding for the visitor the spell of the outdoors, exciting the spirit of exploration. Within them will survive that poetic million-year-old highway, the trail. Among their pathless scenes wild life will be perpetuated. Chains of mountain-peaks will ever stand — "the silent caravan that never passes by, the caravan whose camel backs are laden with the sky" — with purple forests, mountain-high waterfalls, vast and broken cañons, wind-swept plateaus, splendid lakes, and peaks and glaciers often touched with cloud and sunshine.

Our National Parks will continue for generations to come to be the No Man's Land, the Undiscovered Country, the Mysterious Old West, the Land of Romance and Adventure. My great hope and belief is that they will become a marked factor in public education. Surely, these wonder-

lands mean much for the general welfare, and will help to develop greater men and women — to arouse enthusiasm for our native land, and for nature everywhere.

E. A. M.

CONTENTS

I. The Yellowstone National Park . . . 3

1. A Camp-Fire that made History . . 3
2. The Discovery of the Yellowstone . 10
3. The Geysers, Lakes, and Streams . . 28
4. Ages of Fire and Ice 38
5. The Petrified Forests 45
6. Area; Trees, Flowers, and Animals . 51
7. Entrances 53
8. Administrative History 54
9. Lost in the Wilderness 58

II. The Yosemite National Park 65

1. Ice-King Topography 70
2. Trees and Forests 76
3. Plant Life 79
4. The Realm of Falling Water . . . 83
5. Seeing Yosemite 88
6. History of Yosemite 93

III. The Sequoia and the General Grant National Parks 99

The Big Trees 104

IV. Mount Rainier National Park . . . 116

1. The Splendid Wild-Flower Garden . . 122
2. Glaciers of Mount Rainier 130

V. Crater Lake National Park 137

VI. Glacier National Park 148

History of Glacier National Park . . 157

Contents

VII. Mesa Verde National Park 161

VIII. Rocky Mountain National Park . . . 175

IX. The Grand Cañon 190

X. Lassen Volcanic National Park . . . 211

XI. Hawaii National Park 221

XII. Three National Monuments

1. The Olympic National Monuments . 230
2. The Natural Bridges and Rainbow Bridge National Monuments . . 236
3. Mukuntuweap National Monument . 239

XIII. Other National Parks 242

1. Wind Cave National Park . . . 242
2. Sully's Hill Park 244
3. Casa Grande Ruin Reservation . . 245
4. Hot Springs Reservation 246
5. Platt National Park 248
6. Mount McKinley National Park . 248

XIV. Canadian National Parks 251

1. Jasper Park 252
2. Rocky Mountains Park 254
3. Yoho Park 256
4. Waterton Lakes Park 258
5. Revelstoke Park 260
6. The Animal Parks 260
7. St. Lawrence Islands Park . . . 261
8. Fort Howe Park 262

XV. Park-Development and New Parks . 264

XVI. The Spirit of the Forest 282

XVII. Wild Life in National Parks . . . 296

Contents

XVIII. In All Weathers 317

XIX. The Scenery in the Sky 340

1. Timber-Line 340
2. Above the Timber-Line 345
3. The Work of the Ice King . . . 351
4. High Peaks 356

XX. John Muir 360

XXI. National Parks the School of Nature 366

XXII. Why We need National Parks . . 378

XXIII. The Trail 388

APPENDIX

A. Act of Dedication of the Yellowstone National Park 397
B. The National Parks at a Glance . . 400
C. Proposed National Parks 403
D. National Monuments 405
E. Dominion National Parks of Canada . . 412

BIBLIOGRAPHY 415

INDEX 423

ILLUSTRATIONS

JOHN COLTER, THE DISCOVERER OF YELLOWSTONE PARK . . . . . *Frontispiece*
From a drawing by E. S. Paxson

MAP SHOWING LOCATION OF THE NATIONAL PARKS AND NATIONAL MONUMENTS 1

MAMMOTH HOT SPRINGS, YELLOWSTONE NATIONAL PARK 30
From a photograph by George R. King

OLD FAITHFUL GEYSER, YELLOWSTONE NATIONAL PARK 34
From a photograph by Haynes, St. Paul, Minn.

GRAND CAÑON FROM ARTIST POINT, YELLOWSTONE NATIONAL PARK 42
From a copyright photograph by Haynes, St. Paul

PETRIFIED FORESTS IN AMETHYST MOUNTAIN, YELLOWSTONE NATIONAL PARK 46
Adapted from an illustration of the United States Geological Survey

BIRD'S-EYE VIEW OF YOSEMITE VALLEY . . . 66

HALF DOME, YOSEMITE 70
From a photograph by George R. King

UPPER AND LOWER YOSEMITE FALLS . . . 84
From a photograph by the Pillsbury Picture Company

LAKE TENAYA, YOSEMITE NATIONAL PARK . . 88
From a photograph by the Desmond Company

THE FOUR BROTHERS, SEQUOIA NATIONAL PARK 104
From a photograph by Lindley Eddy, Ranger, Cal.

Illustrations

STAGE ROAD, MOUNT RAINIER NATIONAL PARK . 118
From a photograph by Curtis & Miller, Seattle, Wash.

MOUNT RAINIER FROM PARADISE VALLEY . . . 124
From a photograph by Curtis & Miller

CRATER LAKE AND WIZARD ISLAND 138
From a photograph by the Kiser Studio

PHANTOM SHIP, CRATER LAKE 144
By permission of the National Park Service

MCDERMOTT FALLS AND GRINNELL MOUNTAIN, GLACIER NATIONAL PARK 150
From a photograph by Haynes, St. Paul

SPRUCE TREE HOUSE, MESA VERDE NATIONAL PARK 166
From a photograph by Arthur Chapman

ESTES PARK AND ROCKY MOUNTAIN NATIONAL PARK 176
From a photograph by Enos A. Mills.

LOCH VALE, ROCKY MOUNTAIN NATIONAL PARK 180
From a photograph by W. T. Parke, Estes Park, Colo.

FERN LAKE, ROCKY MOUNTAIN NATIONAL PARK 188
From a photograph by H. T. Cowling

LOOKING WEST FROM NORTH SIDE OF GRAND CAÑON, SHOWING POINT SUBLIME AND ISIS TEMPLE 192
By permission of the Department of the Interior

LASSEN PEAK IN ERUPTION 214
From a copyright photograph by B. F. Loomis

MOUNT ST. HELENS FROM THE TIMBER-LINE TRAIL ON MOUNT RAINIER 234
From a photograph by A. H. Barnes

Illustrations

Rainbow Natural Bridge, Rainbow National Monument 238
From a photograph by the Geological Survey

Illecillewaet Valley, with Mount Sir Donald in the Distance, Glacier Park, Canada 252
From a photograph taken for the Commissioner of Dominion Parks

Teton Mountain Region: Proposed Addition to Yellowstone Park 266
From a photograph by J. E. Stimson

Mount Baker from the West 270
From a copyright photograph by W. H. Wilcox, Port Townsend, Wash.

Mount St. Elias from East Side of Agassiz Glacier, Alaska 274
From a photograph by J. C. Russell

On the Road to Sherman Tree, Giant Forest, Sequoia National Park 282
From a photograph by George F. Belden

Elk in Jackson Hole 296
From a photograph by S. N. Leek

Black Bear Cubs, Sequoia National Park . . 304
From a photograph by Lindley Eddy

Long's Peak, from Chasm Lake, Rocky Mountain National Park 320
From a photograph by Enos A. Mills

Above the Timber-Line in the Rocky Mountain National Park, showing Long's Peak . 346
From a photograph by H. T. Cowling

John Muir in Muir Woods 360
From a photograph by Herbert W. Gleason

Trail near Timber-Line, Indian Henry's Park, Mount Rainier 388
From a photograph by Curtis & Miller

By permission of the National Park Service, Department of the Interior

MAP SHOWING LOCATION OF NATIONAL PARKS AND NATIONAL MONUMENTS, 1917

YOUR NATIONAL PARKS

YOUR NATIONAL PARKS

I

THE YELLOWSTONE NATIONAL PARK

I. A CAMP-FIRE THAT MADE HISTORY

On September 19, 1870, a number of men were chatting around a camp-fire in the wilds of northwestern Wyoming. They had been exploring the Yellowstone wonderland. They had seen the geysers, — little hot-water volcanoes, — the pools of boiling colored mud, the great petrified forest, and the golden cañon of the Yellowstone, into whose colored depths the snowy river leaps. The exploration was over, and the men were about to start for their homes.

A group were discussing how they might secure the ownership of this scenic empire. A monopoly of this wonderland would

mean a fortune. The discussion was interrupted. Cornelius Hedges arose before the camp-fire. He said that private ownership ought never to be considered. This region, he thought, should be set aside by the Government and forever held for the unrestricted use of the people. The magnificent National-Park idea was thus born by a camp-fire in the wilds. The views of this statesman prevailed, and it was agreed that the park project be launched at once and vigorously pushed. And this was done. A few enterprising, aggressive men championed the measure so earnestly that the Park became a reality in less than two years after the idea originated.

This celebrated camp was near the junction of the Gibbon and Firehole Rivers, at the foot of what now is National Park Mountain. In 1891 I made a reverent pilgrimage to this historic spot. I am grateful to every one who helped establish the Yellowstone Park. I am glad that the idea of a National Park was a camp-fire thought.

The Helena (Montana) "Herald" of November 9, 1870, had an article by Cornelius Hedges, containing what is probably the first published reference to the park project. Honor must be given to David E. Folsom and a number of other individuals for publicly suggesting, independently, a similar idea. These suggestions, however, were barren of results.

In the course of that autumn a bold park campaign was begun by Nathaniel P. Langford, Cornelius Hedges, and William H. Claggett, who had just been elected Delegate to Congress from Montana. Langford lectured in behalf of the project before interested audiences in Minneapolis, Washington, New York, and elsewhere; and he and Walter Trumbull published magazine articles on the subject. Copies of Langford's article in "Scribner's Magazine" were placed in the hands of every Member of Congress.

Dr. Ferdinand V. Hayden, of the United States Geological Survey of the Territories,

became interested in the cause, and rendered invaluable service. During the summer of 1871 he explored the Yellowstone region and took scores of photographs. In coöperation with others, he drew the bill for Congressional enactment, and marked the boundary lines of the Park. This bill was introduced in the House by William H. Claggett, December 18, 1871. Senator Pomeroy, of Kansas, immediately introduced the identical measure in the Senate. Claggett, Hayden, Langford, and others made a thorough canvass. Each Member of Congress was personally interviewed. The enthusiasm, intelligence, and sincerity of these advocates produced winning results. The question came to a successful vote in the Senate, January 30, 1872. Senator Cole, of California, opposed.

In the House, the Committee on Public Lands reported the bill favorably. Henry L. Dawes, of Massachusetts, championed the measure. It reached a vote, February 27, 1872, with the following result: yeas,

115; nays, 65; not voting, 60. The bill was signed by President Grant, March 1, 1872.

It is a remarkable fact that Congress should have thus created the Yellowstone National Park. Through the ages the privileged classes have had almost exclusive enjoyment of scenic empires. The campaign which brought about the creation of this Park was brief, intense, and unique. It was a genuine and epoch-marking achievement.

The National-Park idea has gone round the world. All leading nations now have national parks and are planning more. Time is likely to stamp our original legislation as one of the important acts of statesmanship. A few public-spirited men of vision began a revolution and triumphed. The anniversary of this event may some day be observed with world-wide celebration. People progress in the improvement of their playgrounds no less than in the ordering of their workshops.

Concerning this National-Park legisla-

tion, General Hiram M. Chittenden, author of "The Yellowstone National Park," makes the following comment: —

Perhaps no act of our National Congress has received such general approbation at home or such profuse commendation from foreigners as that creating the Yellowstone National Park. The lapse of time only serves to confirm and extend its importance, and to give additional force to the sentiment so well expressed by the Earl of Dunraven when he visited the Park in 1874: "All honor then to the United States for having bequeathed as a free gift to man the beauties and curiosities of 'Wonderland.' It was an act worthy of a great nation, and she will have her reward in the praise of the present army of tourists, no less than in the thanks of the generations of them yet to come."

It was a notable act, not only on account of the transcendent importance of the territory it was designed to protect, but because it was a marked innovation in the traditional policy of government. From time immemorial privileged classes have been protected by law in the withdrawal, for the exclusive enjoyment, of immense tracts for forests, parks, and game preserves. But never before was a region of such vast extent as the Yellowstone Park set

apart for the use of all the people without distinction of rank or wealth.

It has been well said that "history is geography set in motion." And "Geography," says Kant, "lies at the basis of history." The peculiar geographic environment of the Yellowstone tract had a definite and striking influence on the early history of the region. It attracted few visitors and no settlers. To the pioneer and the Indian it offered few necessities, and these were almost inaccessible owing to climatic discomforts and difficulties of communication. Even to-day, for commercial use, the Yellowstone country would support only a sparse population.

But what formerly repelled now attracts. Time has brought changes. Congested population, the necessity for outdoor life, the destruction of most of the wild outing-places — these conditions have given to this and to other scenic mountain places a high economic value; likewise what may be called a nobler or higher value. Reserved

and used as a recreation park by the public, it has become an economic asset of enormous importance. And through park use it conveys benefits to thousands.

Yesterday the Yellowstone environing factor arrested, deflected, and retarded the movement and the development of society. To-day it attracts, arouses, energizes, and ennobles a multitude.

2. THE DISCOVERY OF THE YELLOWSTONE

In the Yellowstone National Park — the first national park in the world — are so many natural wonders, of such unusual character, that not until the tract was discovered the sixth time were the American people convinced of its existence. Sixty-three years elapsed from the time of its first discovery to that of its recognition as an actuality.

The first two discoveries — they were made by trappers a generation apart — were laughed at and soon forgotten. The third, by prospectors, led to a successful

private exploring expedition from Montana. This was followed by a larger and semi-official expedition, which also achieved its object. The sixth and last was an official discovery by the United States Government.

The Indians of the Yellowstone region knew of the present Park tract. They had a north-and-south trail across it, also one from east to west. To them it was the "Top of the World," the "Land of Burning Mountains," and the "Yellow Rock." But its wonders appear to have produced little or no impression on the Indians; there is an absolute dearth of myths, legends, and even of superstitions concerning it. To me this is remarkable. From every point of view the natives regarded the Yellowstone with indifference. Lewis and Clark daily questioned Indians concerning the character of the country, but the explorers heard nothing of the Yellowstone wonderland, although they passed and repassed within a few miles of it.

The Indians made scant use of this territory. In an average year the passes into it are blocked with snow for nine months of the twelve. Besides, it is mostly covered with a tangle of forests. In earlier days, living in it or traveling through it was difficult. Though filled with big game during the summer, at no time of year was it equal to the surrounding country as a hunting-ground.

John Colter, who first discovered the Yellowstone region in 1807, was a member of the Lewis and Clark expedition. He was a hunter and trapper, a master of woodcraft, and an outdoor man of the first class; at the time of the discovery he was thirty-five years of age, nearly six feet tall, and an athlete who could hold his own in the games of the trappers' rendezvous. His endurance, courage, and resourcefulness were marvelous. Neither wilderness nor hostile Indian had terrors for him. The five years that he spent in the Yellowstone region were so crowded with wilderness ad-

venture that his name is immortal in the history of the American frontier. He obtained his release from the Lewis and Clark exploring party at a point on the Missouri River, some distance below the mouth of the Yellowstone, in August, 1806. He had served with the expedition more than two years.

With two trappers, Colter that year proceeded up the Missouri and spent the winter somewhere on its headwaters. The following spring he left his companions and started for St. Louis. After a solitary journey of about two thousand miles, he met Manuel Lisa, the celebrated trapper and trader, who, with a large party, was on his way to found a trading-post somewhere on the headwaters of the Missouri. Lisa persuaded Colter to turn back with him.

Strong is the lure of the wilderness. Although Colter had been away from civilization three years, and a triumphant welcome awaited his return, he again postponed the enjoyment of all that old friends

and city attractions could offer, to resume the adventurous experiences of a trapper's life among hostile Indians in the wilds.

Lisa built a trading-post, Fort Manuel, at the junction of the Big Horn and Yellowstone Rivers, about two hundred miles southeast of the Yellowstone Park. From here, with a thirty-pound pack and rifle, Colter set off alone on a thousand-mile journey into the wilderness to tell the surrounding Indian tribes of this new trading-post.

He traveled a few hundred miles to the southwest without notable adventure. We now marvel at the results of this journey, for its discoveries put Colter in the front rank of geographical explorers on the American continent. He discovered the Wind River Range, Union Pass, Jackson Hole, Teton Pass, Pierre's Hole, and the Grand Teton. He was the first to see the headwaters of those two great rivers the Green Fork of the Colorado and the Snake Fork of the Columbia. These discoveries

might well have been enough for any one man, but his greatest discovery was still before him.

Colter was with a band of Crows near Pierre's Hole when it was attacked by marauding Blackfeet. Of necessity Colter fought with the Crows, who were victorious. The Blackfeet blamed Colter for their defeat, and from this incident may have arisen the long-continued hostility of the Blackfeet tribes against the whites.

Again alone, Colter set forth from Pierre's Hole, St. Anthony, Idaho, and traveled straight across the mountains to Fort Manuel. A wound in the leg, which he had received in the fight with the Blackfeet, was not yet healed. The direct route that he took for his return may have been chosen as the shortest, but most probably was selected in order to avoid the Blackfeet.

The crowning achievement of this remarkable journey was the discovery and traversing of the Yellowstone wonderland. His course took Colter diagonally, from

southwest to northeast, across what now is the Yellowstone National Park. He probably passed along the west shore of Yellowstone Lake, and may have followed the Yellowstone River from the lake to the falls. He saw numerous geysers, hot springs, paint-pots, and possibly Sulphur Mountain. He noted that numerous rivers had their sources in the Park and flowed from it in all directions, thus justifying the Indian name for the region, "Top of the World." After crossing Mount Washburn he probably forded the river near Tower Falls and then followed the east fork of the Yellowstone.

Colter arrived safely at Fort Manuel after a journey of about three hundred miles from Pierre's Hole and a round trip of about eight hundred miles. Aside from its geographical value, this was a remarkable wilderness achievement.

A little later came the most extraordinary chapter of Colter's adventurous life. In 1809, with a companion named John

Potts, he was trapping beavers near the Three Forks of the Missouri. They were rowing up a small stream that flowed into the Jefferson River, the most western of the forks. At a point on this stream about five miles from the Jefferson, they heard a great trampling. High banks and brushwood shut off their view.

Presently about five hundred Blackfeet appeared on the banks and ordered them to come ashore. Escape was impossible. The two men had the hardihood to throw the beaver-traps overboard, hoping to recover them later. As the canoe touched the shore, an Indian snatched Potts's rifle from him. Thereupon Colter sprang ashore, wrested the rifle from the Indian, and handed it to Potts who immediately pushed off into the stream. Colter told him to come back and not to try to escape. An arrow whizzed by Colter, and Potts fell back in the canoe, crying out, "I'm done for!" as he shot an Indian dead. In an instant his body was filled with arrows.

The Blackfeet seized Colter and stripped him naked, then discussed methods of torturing him to death. They decided to set him up for a target, but the chief interfered — that was not exciting enough for him. Seizing Colter by the shoulder, he asked him if he could run fast. The question was greeted with howls of delight by the Blackfeet.

The chief led Colter out on the prairie about three hundred yards from the band, pointed in the direction of the Jefferson River, told him to save himself if he could, and cast him loose. Colter ran, the Blackfeet whooped and pursued, and the race for life was on.

The ground was thick with prickly pears that pierced Colter's bare feet. Nevertheless, he kept ahead of his pursuers. When about half the five miles to the Jefferson had been covered, he ventured to look back. The Indians were much scattered, and he had gained on the main body; but one Indian, carrying a spear, was close upon him.

Colter exerted himself to the utmost, and by the time he came within a mile of the Jefferson he was exhausted and blood from his nostrils had covered the front of his body. He stopped suddenly, turned, and spread out his arms. The Blackfoot, almost upon him, but also exhausted, attempted to stop and throw his spear, but he fell and the spear broke. Colter sprang upon him, seized the spear-head, pinned him to the ground, and ran on.

The foremost of the remaining Indians stopped by the fallen runner. When others came, they all set up a whoop and resumed the chase.

Colter gained the river-bank in advance of all his pursuers, just where there happened to be a large beaver house, standing partly against the bank and partly in the water. Knowing that the entrance to the house was at the bottom, under the water, he dived and succeeded in forcing his way to the floor just above the water-level.

Man fleeing from man has hidden in

strange places, but it may be doubted whether one ever before sought safety in a beaver house of brush and mud!

Soon the Blackfeet were searching all over the place, "screeching like so many devils." They made search for the naked white man all the rest of the day. Apparently even their savage cunning never suspected the beaver house. Although they frequently clambered over it, they did not disturb it.

When night came and Colter could no longer hear the Indians, he swam downstream, gained the prairie, and headed for Fort Manuel, some two hundred miles away. Naked, with bleeding feet, he walked over prickly pears on the prairie and through snow in the mountains, which he crossed above the timber-line. The sun blistered him. Part of the time, he traveled by night and lay hid by day. He appears to have lived chiefly on the Indian-turnip (*Psoralea esculenta*).

Colter arrived at Fort Manuel in terrible

shape. At first the men did not recognize him. He had been eleven days in making the distance between Three Forks and the fort.

That winter Colter had the courage to go back alone to the scene of his capture to recover his beaver-traps. Before he reached them he was ambushed by Blackfeet, but escaped. He returned to the fort, and the following spring he was with Pierre Menard at Three Forks when the place was successfully attacked by Blackfeet. Colter was among the few who escaped.

Pierre Menard wrote a four-page letter to his brother-in-law, Pierre Chouteau, and Colter started with it for St. Louis. With a companion, "Mr. William Bryant," he made the three-thousand-mile journey by canoe in thirty days. Upon his arrival at St. Louis, he reported to his old commander, William Clark; told him the story of his journeys, discoveries, and adventures, and gave him much material for his forthcoming map of the Lewis and Clark expedi-

tion. Clark traced on the map the route of Colter's Yellowstone Park journey and gave it the legend "Colter's Route of 1807."

There is nothing incredible about any of Colter's stories. His accounts of the Yellowstone region appear to have been remarkably true to fact. His escape from the Indians, and his various journeys, are experiences within the range of human achievement. His hiding in a beaver house is easily possible. His race and his naked journey across the mountains show the courage and hardihood of the frontiersman of the day. I have been over the place where he ran for his life from the Blackfeet and have followed his trail across the mountains.

Henry M. Brackenridge, the author of "Views of Louisiana, together with Journal," secured Colter's story at first hand, and he does it justice. John Bradbury, author of "Travels into the Interior of North America," did much important work in the Mississippi and Missouri Valleys in the

years 1809–11. He also got Colter's story from Colter himself, and gives a careful account of the race for life with the Blackfeet. The account given by General Thomas James, in "Three Years among the Indians and Mexicans," is a third first-hand story of Colter's activities. Washington Irving was too good a literary craftsman to overlook Colter's story. In "Astoria" he retells the escape from the Blackfeet. General Hiram M. Chittenden gives full appreciation to Colter in his "History of the Early Western Fur Trade" and "The Yellowstone National Park," both standard works.

Nevertheless, St. Louis did not believe Colter. He told his travels, discoveries, and adventures, and the people laughed in derision. For two generations St. Louis mockingly referred to the Yellowstone wonderland as "Colter's Hell."

Colter married and went to live near Daniel Boone at La Charette. He declined to join the Astoria expedition, and this is

the last heard of him. He may have died shortly afterwards; or it is possible that, because of unjust public opinion, he may have moved into seclusion. At any rate, the later years and the burial-place of the first discoverer of the Yellowstone National Park are unknown.

Colter's story is a wilderness story of supreme character. It is full of the vigor and independence of outdoors. Colter is an heroic and picturesque figure in national history. I wish every boy and girl in the land could read his adventures.

The second discovery of the Yellowstone site was also made by a trapper. James Bridger, of Fort Bridger fame, was there in 1830, but his description of its wonders was laughed at as "just another of old Jim Bridger's good yarns." Between 1830 and 1843 the region was visited by many trappers and traders, and its wonders were common knowledge to the plainsmen of the Missouri Valley. Some accounts got into print. Nevertheless, the Yellowstone was

no more real to the American of that generation than was "Colter's Hell" to the generation before.

Trapping began to fall off. The Mexican War and the California gold excitement led public attention away from the Yellowstone country, and by the beginning of the Civil War it was as completely forgotten as if it had never been known.

It was the prospector who gave the Yellowstone tract to the world for the third time. By 1865, reports of its wonders had been spread far and wide by prospectors attracted to the region by the Montana gold excitement. At last Montana became mildly curious over these reports. In 1869, David E. Folsom, C. W. Cook, and William Peterson visited the region. They told enough to bring about the organization of a large semi-official expedition.

This Yellowstone expedition (1870) is known as the "Washburn-Doane Expedition," and from it dates the latter-day history of the Park. Lieutenant Gustavus C.

Doane, Second Cavalry, U.S.A., with a sergeant and four privates was detailed from Fort Ellis to escort the expedition. Among its nine civilians were General Henry D. Washburn, Surveyor-General of Montana; Nathaniel P. Langford, author of "Vigilante Days and Ways" and first superintendent of the Park; Cornelius Hedges, who first proposed setting apart the region as a National Park; and Samuel T. Hauser, president of the First National Bank of Helena, and later Governor of Montana.

So skeptical was this party that when the steam of Old Faithful was first seen through the woods it was believed to be a forest fire.

Mr. Hedges subsequently said, "I think a more confirmed set of skeptics never went out into the wilderness than those who composed our party, and never was a party more completely surprised and captivated with the wonders of nature."

Through the press and lecture-platform, the Washburn-Doane expedition spread

the knowledge of its discoveries broadcast over the country. The direct result of its work was that the United States Government sent an official expedition to the Park the next year. This was a joint expedition made up from the Engineering Corps of the Army and from the United States Geological Survey of the Territories. The official United States Government expedition of 1871 officially put it on the map, with official scientific notes and photographs. Thus the sixth discovery of this wondrous region, after two generations of unbelief, convinced the people that it existed!

During these two generations the unexplored wilderness of the Louisiana Purchase had been formed into seven new States of the Union, containing more than five million people. And "Colter's Hell," when its existence had been finally and officially established, was within two hundred and fifty miles of a transcontinental railroad.

3. THE GEYSERS, LAKES, AND STREAMS

Water in numberless pleasing forms is one of the attractive features of the Yellowstone Park. There are snowy waterfalls that leap in glory. There are geysers — transient, towering, fluted — with white columns draped with steam. Both the geysers and the waterfalls bring the rainbow to them; or, the prismatic springs go to the rainbow for their colors. The cascades have all the excitement of ocean breakers. The lakes mirror the clouds, and their placid bosoms reflect the stars that are "in the quiet skies." There are streams that wind and linger, and brooks that go on forever. There are hot springs and cold, large springs and small, each with its own attractive setting. Many burst through the roofs of caves; others gush from grottoes; still others pour forth from mounds and columns.

The quiescent springs and prismatic pools have a delicate, exquisite, gemlike

beauty unlike anything else in the world of nature or of art. The waters are soft blue. Changing lights tinge the water with iridescence; touch its surface with soft luminosity; give to moulded and sculptured basins a refinement of coloring that transcends belief.

Dr. Ferdinand V. Hayden gives this glowing description: —

> The wonderful transparency of the water surpasses anything of the kind I have ever seen in any other portion of the world. The sky, with the smallest cloud that flits across it, is reflected in its clear depths, and the ultramarine colors, more vivid than the sea, are greatly heightened by constant, gentle vibrations. One can look down into the clear depths and see with perfect distinctness the minutest ornament on the inner sides of the basin; and the exquisite beauty of the coloring and the variety of forms baffle any attempt to portray them either with pen or pencil.

These waters repose in basins that have in miniature all the beauty of the Mammoth Cave. The basins and their rims are formed of minerals — mostly of silica —

deposited by the water. The rims are fittingly beautiful; the lines of internal construction are harmonious. Many springs have built up their basins with precipitated minerals until they rest on mounds. All these are picturesque, and some are beautiful.

Morning-Glory Spring is like a gigantic morning-glory set in the earth. The Firehole, with a black fissured bottom, has at times flamelike colors which create such an illusion that the fiery interior of the earth appears to be on exhibition.

Prismatic Lake, a spring large enough to be called at least a lakelet or pond, is a combination of the artistic and the spectacular. It has built up for itself a rounded mound, and down the gently curving slopes flow its waters in thousands of interlacing rivulets. Over the pool hangs a cloud of steam, often tinted red by reflection from the waters below.

At Mammoth Hot Springs, close to Fort Yellowstone, the water bursts from the

MAMMOTH HOT SPRINGS
YELLOWSTONE NATIONAL PARK

mountain-side with an enormous mineralized flow. Here lime in solution is quickly precipitated, forming basins and terraces and slopes of exquisite design, the whole adorned with intricate and fantastic fretwork of pink, brown, yellow, and white.

While the deposits here are chiefly lime or travertine, those of the geysers and of the other hot springs are silica. The two kinds of deposits differ greatly. The Mammoth Hot Springs' deposits are soft and frequently change their form. The silica deposits of the geysers are hard as flint. Without this hardness, the geyser action would be impossible, as the lime and travertine formations would not withstand the explosive violence. A curious fact in this connection is that the color in and around the geysers and hot springs is in part due to the presence of algæ, a minute vegetable growth.

The geyser is one of Nature's strangest freaks. These in the Yellowstone Park are the largest, most spectacular, and most

artistic in the world. The geyser may be described either as a large intermittent hot-water fountain or as a small water-and-steam volcano. There are scores of these eruptive springs in the Yellowstone, and their irregularities form part of their fascination. The place and method of applying the heat, the diameter and shape of the tube, and the point of inflow and the quantity of the water are all matters affecting their activities. Apparently they, as well as the springs in general, have no underground interconnection, since the play of one geyser has no effect upon others close by.

The eruptions are irregular as to intervals. Black Warrior and Hurricane do a continuous performance. Constant pauses from twenty to fifty-five seconds between gushes. Grand is active at intervals of from one to four days, and Turban plays intermittently for twenty-four hours following Grand. Giantess rests from five to forty days at a time. Lioness played once

in each of the years 1910, 1912, and 1914. Splendid, which formerly threw a ten-minute gush to a height of two hundred feet, has not played since 1892.

There is equal variation in the duration of the gush. The Minute Man's activity lasts but from fifteen to thirty seconds. Giant stops work promptly at the end of an hour. Giantess, after her long rest, plays from twelve to thirty-six hours.

The quantity of water erupted varies from a few gallons in the small geysers to thousands of barrels in the large ones. The water is generally thrown vertically, though some of the tubes lie at an angle. The Fan, as its name suggests, throws its water in a fan-like shape.

Geysers vary in the height of their gush as in everything else, and the gush of each is seldom twice the same. Jewel varies from five feet to twenty, and Great Fountain from seventy-five to one hundred and fifty feet.

The highest stream is thrown by Giant,

which has a minimum of two hundred and a maximum of two hundred and fifty feet. Excelsior, which sometimes threw its water three hundred feet into the air, has not played since 1888.

This geyser action is novel, picturesque, and weird. It appeals to the imagination. It goes on day and night, summer and winter, throughout the years. While many of the geysers are comparatively new, others are centuries old. Some may have been playing since prehistoric times.

Old Faithful, in the Upper Geyser Basin, is in most respects the most wonderful geyser in the Park. Its action is almost uniform; its usual interval is seventy minutes. It plays for four minutes and sends its water up from sixty to one hundred and twenty feet. It gives ample warning before each play and gets into action by sending its water higher and higher with graceful ease.

But in some particulars Great Fountain, in the Lower Geyser Basin, may be put at

OLD FAITHFUL GEYSER
YELLOWSTONE NATIONAL PARK

the head of the geyser list. Its waters issue from a vast low mound, and the basin has attractive ornamentation. It spouts an enormous volume of water, sometimes to a height of one hundred and fifty feet, and plays from forty-five to sixty minutes, at intervals of eight to eleven hours.

Castle Geyser, in the Upper Geyser Basin, throws only a moderate gush about seventy-five feet in height, but it has built up a most imposing crater. It is quiet for from four to seven days; it then plays three or four times at half-hour intervals.

Other geysers that the visitor may well see are Grand and Beehive, both in the Upper Geyser Basin. Grand plays for about an hour at intervals of from one to four days and throws a column of steaming water smoothly to a height of two hundred feet. Of all the geysers, Beehive perhaps approaches nearest to artistic perfection. From a small, beehive-like mount it sends up a slender column of water vertically and symmetrically two hundred feet.

Yellowstone Lake lies at an altitude of 7741 feet above sea-level. Its area is about one hundred and thirty-nine square miles, and its irregular shore-line has a length of one hundred miles. In places the lake is three hundred feet deep. There are thirty-six other lakes, of which Shoshone, Heart, and Lewis are the largest. Each has its own peculiar and delightful wilderness boundary and beauty.

There is a close network of streams, of which one hundred and sixty-five have names. Among the more important are Yellowstone, Lamar, Snake, Gardiner, and Firehole Rivers. There are numerous waterfalls and cascades. The extensive waterflow abundantly supplies the headwaters of the Missouri, Yellowstone, and Snake Rivers. In Two Ocean Pass, among other places, is a lakelet upon the very summit of the Continental Divide whose waters flow to both the Atlantic and the Pacific. The altitude here is 8150 feet, and the lakelet completes a continuous waterway

of nearly six thousand miles from coast to coast.

A map that I carried showed Two Ocean Pond on the Continental Divide to the west of the Thumb. There is a Two Ocean Pond on the Divide at that place as well as one to the south of the lake. But my map did not show that the Divide was horseshoe-shaped, and it located the pond on the wrong arm of this horseshoe. Consequently I had a long search before I found the pond, and much confusion with the topography and watersheds after I had discovered it.

One day in 1891 I had the good fortune to come upon General Hiram M. Chittenden. He was directing the cutting of trees at a place that has since become famous as Lake View, from which, perhaps, the best view of Yellowstone Lake is to be had. General Chittenden spent many years in the Park and developed its existing scenic road system. He was the first to propose that the excess of elk and other game in

this and other parks be distributed over the country at cost.

What is the greatest feature in this wonderland whose history began at a campfire? The Lower Falls thrilled me more than any other waterfall I ever have seen. The Yellowstone Cañon may be called the greatest attraction in this Park. But to me the supreme attraction is the petrified forests.

4. AGES OF FIRE AND ICE

The Yellowstone plateau is a vast lava-deposit. Its material is mostly volcanic, but its landscape — its architecture — is largely glacial. In ages remote, this realm became the scene of volcanic activity. Intermittent outpourings went on through long periods of time. Volcanoes in and near the Park threw forth quantities of ashes, lava, and cinders, which built up a plateau region three or four thousand feet thick. Rhyolite and other forms of lava

were last spread over the region. This volcanic activity appears to have ended before the last ice age. No eruption has occurred for centuries. The ice age wrought vast changes in the volcanic landscape. The ice smoothed wide areas, shaped cañons, and rounded mountain-sides, produced and spread soil, and gave the entire region the flowing, attractive lines of glacial landscape.

On the rim of the Yellowstone Cañon, about three miles below the falls, an enormous glaciated granite boulder reposes upon lava — rhyolite. It measures about twenty-four by twenty by eighteen feet. It was transported to this resting-place from mountains more than thirty miles away. Here we have a stone foundation laid by volcanic fire, and upon it a stone, shaped, transported, and placed by glacial ice.

There are about three thousand geysers, hot springs, and mud-and-water springs in the Park; and as many other vents of steam, acid, and gas. That the geysers

have been active in this region for thousands of years is shown in the deep deposits of silica and travertine that overspread extensive area. During the ice age many of these deposits were eroded and others were piled with boulders. It is plain that steam and hot water had been at work long before the last ice age came. During the ice period, a wild conflict probably took place between the deep outspread ice and the insistent eruptions of steam and hot water.

The surface of Yellowstone Lake once stood about one hundred and eighty feet higher than it is at present. Its outlet was then through the Snake River to the Pacific Ocean. The Continental Divide then passed over the summit of Mount Washburn. Unwritten as yet is the splendid geological story of this change, which may have been caused by earthquake upheaval or by subsidence. It appears to have occurred about the close of the last glacial epoch. Possibly ice dammed the narrow

gorge of Outlet Creek, through which the waters of the lake formerly flowed to the Snake River. Whatever the cause, its outlet waters changed and eroded the now famous and splendidly colored cañon of the Yellowstone.

This is the most celebrated cañon in the Park, and its colors make it one of the most gorgeously startling in the world. At bright noonday, it is adorned with all the hues of the sunset sky. Its precipitous walls are comparatively free from vegetation and are broken with pinnacles and jagged ridges. About fifteen hundred feet below the edge, the rushing waters of the Yellowstone River take on various shades of blue and green between accumulations of gray foam.

Into the upper end of this cañon the river, about seventy feet wide, makes a sheer leap of three hundred and ten feet. From the near-by rim, this wonderful waterfall appears like an enormous, fluffy, endless pouring of whitest snowflakes.

The magnificence and wildness of its setting combine to make it one of the most imposing waterfalls in the world.

The paint-pots are the curiosities of the Park. They are craters, or irregular-shaped ponds, in the earth, filled with brightly colored mud, thick and hot, of fine texture, and in appearance resembling kalsomine or paint freshly mixed and colored. The mud in many pots is red or pink; that in others is lavender, blue, orange, or yellow. Occasionally a rugged vat of this mud is found boiling away — very suggestive of slaking lime. In other cases, plastic mud throbs and undulates as steam-jets now and then escape through it. Here and there this bright steamy mud opens like a full-blown lily. The paint-pots near the Fountain Geyser, those east of the road in Gibbon Meadows, and those close to the lake at the Thumb are the more attractive.

John Muir, in "Our National Parks," says of the Yellowstone: —

Copyright by Haynes, St. Paul

GRAND CAÑON FROM ARTIST POINT
YELLOWSTONE NATIONAL PARK

Beside the treasures common to most mountain regions that are wild and blessed with a kind climate, the Park is full of exciting wonders. The wildest geysers in the world, in bright, triumphant bands, are dancing and singing in it amid thousands of boiling springs, beautiful and awful, their basins arrayed in gorgeous colors like gigantic flowers; and hot paint-pots, mud springs, mud volcanoes, mush and broth caldrons whose contents are of every color and consistency, plash and heave and roar in bewildering abundance. In the adjacent mountains, beneath the living trees the edges of petrified forests are exposed to view, like specimens on the shelves of a museum, standing on ledges tier above tier where they grew, solemnly silent in rigid crystalline beauty after swaying in the winds thousands of centuries ago, opening marvelous views back into the years and climates and life of the past. Here, too, are hills of sparkling crystals, hills of sulphur, hills of glass, hills of cinders and ashes, mountains of every style of architecture, icy or forested, mountains covered with honey-bloom sweet as Hymettus, mountains boiled soft like potatoes and colored like a sunset sky.

I had lively scrambles and saw much petrified wood in the rough mountainous

country at the northwest corner of the Park. But the roughest and most scenic section visited was around Sylvan Pass. This rugged, narrow pass cuts through high, crowding mountains. To the north, Hoyt Mountain and Avalanche Peak rise precipitously; to the south, Grizzly and Top Notch Peaks. Sylvan Lake, whose peculiar wild beauty is unexcelled, is near this pass. The tree-sprinkled, grassy section near the Lamar River, in the northeast corner of the Park, was the most charming and parklike section visited.

The Grand Teton, a peak of towering, bold individuality, looms imposingly as seen from various points in the Park. Its appearance across Yellowstone Lake, from a point near the outlet, is magnificent. Another excellent view of it is obtained from the stage-road midway between Upper Geyser Basin and the Thumb.

The Grand Teton territory might well be added to the Park; likewise a stretch of the rugged, mountainous territory ly-

ing along the southeast corner, and the mountainous tract immediately west and north of the northwest corner of the Park. All these belong to reserved government lands, and could without difficulty be administered as a part of this wonderland.

5. THE PETRIFIED FORESTS

Volcanic outpourings have ended the life of many extensive Yellowstone forests. In Amethyst Mountain are twelve forests, one above the other, buried at different periods by volcanic eruptions. On top of this mountain the pines and spruces are merrily growing, unmindful of the buried past — of the tragic tree history beneath. Nature forgets. Ages ago, the lowest of these entombed forests grew on the mountain plateau in the sunlight. But a flow of volcanic mud and heavy showers of ashes overwhelmed and buried it, with the trees standing erect.

This volcanic material added a layer to the plateau. In the new surface above

the buried and forgotten forest, another tree growth flourished and towered. But the volcanoes only slept. Again their fire and ashes filled the sky, and again the forest was overwhelmed. Thus through the ages — through "a million years and a day" — each time the volcanoes slept the pines peeped up, and again their shadows fell upon the desolate lava landscape.

At last, twelve or more forests were buried, each as it had stood upon the mountain, and in a layer by itself. The material in these numerous fateful volcanic outpourings raised the summit two thousand feet.

It may be that the topmost of these petrified forests was overwhelmed by the Ice King, but a volcano entombed the others. All were petrified, fossilized, or opalized. During the ages that went by, the Lamar River and other factors eroded a wide valley and excavated the edges of these forest ruins.

This reveals one of the most appealing

PETRIFIED FORESTS IN AMETHYST MOUNTAIN
YELLOWSTONE NATIONAL PARK

geological stories ever uncovered — twelve illustrated but unwritten chapters of world-building.

The strata of these twelve forests, story above story, show their edges in the precipitous northern face of Amethyst Mountain. Thousands of logs and stumps still partly buried jut and bristle.

Apparently there is an enormous area of these buried fossil forests in the northeast part of the Park, and perhaps numerous areas elsewhere in the region. They are also known to exist near the northwest boundary of the Park.

Mineralized water circulated through and gradually fossilized the buried trees, changing many to opal. In due time the mud and ashes that buried these trees also turned to stone. Limbs and tops of trees were broken off by the ashes, cinders, and mud that buried each forest. Many tree-trunks were overthrown, but great numbers were entombed as they stood. They are from one to ten feet in diameter, and some were

of great height. Many of the remaining stumps project forty feet.

Much of the opalized wood is very beautiful. The change brightened and intensified the former texture of the wood. In most of these stone trees and logs the annual rings show clearly. They distinctly reveal the age of the tree and its rapidity of growth. In many cases the species is readily determined. Strange stories are told by the fallen logs, in many of which old worm-holes show. The half-decayed logs were preserved in their original form, and in the process of fossilization their hollow interiors were filled with beautiful rosettes and crystals.

Each of the buried forests contained some trees of different species from those in the forest just beneath it. Altogether, more than eighty kinds have been recognized. Many of these would grow only in a mild or subtropical clime, so the former climate of this region must have been warmer than at present. Among the trees

were redwood, cottonwood, walnut, pine, oak, sycamore, fig, magnolia, and dogwood.

Ancient Troy was nine ruined cities deep. But here in a national playground of our own country are twelve tree cities in ruins, one above another, and topped with a city of living trees. Like the excavated ruins of Pompeii, these ruined forests set one's mind to exploring the realm of imagination. Here in a subtropical clime, possibly a million years ago, was a luxuriant forest. Beneath was a crowded undergrowth of plants, of shrubbery and waving ferns. Gay butterflies may have flitted here in the golden sunshine. Trees enjoyed the storms and lifted their heads serenely into the light. Then came the tragic end. Twelve times or more was this impressive drama reënacted.

Trees, like men, often rear their structures upon the ruins of those that have gone before. This is an old, old world. In the words of Omar, —

"When You and I behind the Veil are past,
Oh, but the long, long while the World shall last."

Is the volcanic curtain once more to fall upon the forests of this magic scene?

In "Our National Parks" John Muir comments eloquently upon the fossil forests and the telling background of most Yellowstone landscapes. He says: —

Yonder is Amethyst Mountain, and other mountains hardly less rich in old forests, which now seem to spring up again in their glory; and you see the storms that buried them — the ashes and torrents laden with boulders and mud, the centuries of sunshine, and the dark, lurid nights. You see again the vast floods of lava, red-hot and white-hot, pouring out from gigantic geysers, usurping the basins of lakes and streams, absorbing or driving away their hissing, screaming waters, flowing around hills and ridges, submerging every subordinate feature. Then you see the snow and glaciers taking possession of the land, making new landscapes. How admirable it is that, after passing through so many vicissitudes of frost and fire and flood, the physiognomy and even the complexion of the landscape should still be so divinely fine!

6. AREA; TREES, FLOWERS, AND ANIMALS

The Yellowstone Park is about equal in area to Delaware and Rhode Island combined. It has 3300 square miles. The average altitude is 7500 feet, while numerous peaks rise from 1000 to 3000 feet higher. Forests cover 85 per cent of the area.

The largest parklike grassy space in this forested realm lies to the northeast of Mount Washburn, along the valleys of the Yellowstone and Lamar Rivers. This open space is about twenty-five miles long and from five to ten miles wide. The second largest area of grassy country, Hayden Valley, lies several miles to the north of Yellowstone Lake. Among other open spaces are Swan Lake Flat, Gibbon Meadows, Pelican Valley, and the small ragged areas around the Firehole Geyser Basin and Shoshone and Lewis Lakes.

Among the trees are the quaking aspen, Douglas spruce, Engelmann spruce, and subalpine fir. The overwhelming propor-

tion of these forests, however, consists of that interesting tree, the lodge-pole pine. It bears seed every year, beginning while young and small. It hoards its seeds by keeping its tightly closed cones. When fire sweeps through a forest of lodge-pole pine, it kills the trees and melts the sealing-wax of the cones, releasing the seeds. These seeds fall upon shadeless, ash-covered ground, under conditions most favorable to their germination and growth. The lodge-pole pine is Nature's selected agent for reforestation.

The Yellowstone is a wild-flower garden. Wander where you will, you have the ever-new charm, the finishing touch, the ever-refreshing radiance of the wild flowers. Many are brilliantly colored. There are species of gentians, lupines, and pyrolas. The columbine is there in all its graceful beauty. The wild rose abounds. The Indian paintbrush perhaps is most abundant. The pentstemon is common. There are two species of orchids.

The Yellowstone is the greatest elk-range in the world. It has a numerous grizzly-bear population. In fact the park has so large and varied a population of birds and wild animals that in most respects it is the greatest wild-life preserve in the world.

7. ENTRANCES

To the Yellowstone wonderland there are four entrances. The Northern Pacific touches the northern entrance at Gardiner, Montana. This route is through the Gardiner Cañon to the Mammoth Hot Springs at Fort Yellowstone.

The western entrance is from the Union Pacific at Yellowstone. This route takes the visitor directly to the central geyser basin of the Park.

The eastern entrance is from the Burlington at Cody, the road passing the Shoshone Dam, crossing the Absaroka Range at Sylvan Pass, and making connection with the Park routes at the Lake Hotel.

The southern entrance is from the Jack-

son Lake and Teton Mountain region and makes connecton with the Park routes at the Thumb.

The present Park road-system, though incomplete, touches most of the Yellowstone's greater and more lovely attractions. This system will be extended from time to time on a comprehensive plan. Supplementing these roads is a system of trails, which needs to be greatly extended, especially in the more mountainous parts of the Park.

The Yellowstone is at present the largest of our sixteen National Parks, and as the oldest of our scenic parks, it is entitled to head the imposing list. As a natural wonderland of varied attractions there is nothing like it in the whole world.

8. ADMINISTRATIVE HISTORY

The early administrative history of the Yellowstone National Park, and that of the celebrated Yosemite State Park of California, are records that no real American

will ever read without a sense of shame. Both these splendid regions were long neglected by the public and by legislators. In those days scenery had no standing and few friends. It was treated as an outcast.

The act of dedication for the Yellowstone National Park made it a reservation "for the benefit and enjoyment of the people." The aim was to preserve its natural curiosities, its forests, and its game, and to make such development of the Park that the people might conveniently and freely see and enjoy it. For several years Congress failed to provide adequate appropriations either for the development of the Park or for its protection. It was given over to the administration of the Secretary of the Interior. Unfortunately, the act that created the Park contained no code of laws, did not define offenses, made no provision for the handling of legal cases or for the punishment of offenders. It failed to provide even the legal machinery necessary to enforce the regulations written by the Secretary of the

Interior. The history of the Yellowstone for twenty-two years after its creation is, as Helen Hunt said of our treatment of the Indian, a tale of dishonor.

The first Superintendent of the Park was Nathaniel P. Langford, who had rendered distinctive services in having it created. With his hands tied he endured the position for five years, and did heroic work in trying to suppress license, start development, and lay a broad foundation for the future welfare of the enterprise. The interests fought him, and the public condemned him for inefficiency for which the public itself, and not he, was to blame.

Hunters invaded the Park and slaughtered game. One company almost secured leaseholds on extensive land-areas which would have given them a dangerous monopoly of all the leading attractions. A water-power company almost obtained title to Yellowstone Falls. Many attempts were made to run a railroad through the Park. A few people, at enormous sacrifice and

through heroic and efficient efforts, saved it in its primitive naturalness. Among those who splendidly helped was George Bird Grinnell. At last Congress became interested, and in 1883–84 helpful legislation was passed.

On August 20, 1886, came a change for the better. The Secretary of the Interior availed himself of legislation that Congress had recently passed and called upon the War Department for assistance. Captain Moses Harris, with the title of Acting Superintendent, became the first military commander of the Park. Reforms were inaugurated, and development was begun. This military control has continued for twenty years, and for the most part the results have been satisfactory. General Chittenden, of the Engineer Corps of the Army, developed the present road-system. The character of the various military superintendents of the Park has been good, and the achievements of these men have won the praise even of those who are against the

use of soldiers or military regulations in the Park government. I am particularly impressed with the work of the last commander, Colonel L. M. Brett. The honor, ability, and peculiar characteristics of these military commanders have enabled them to do excellent work. On October 1, 1916, all troops were withdrawn from the Park and a force of civilian rangers was organized.

9. LOST IN THE WILDERNESS

The Washburn-Doane Expedition of 1870, which proved a large factor in the creation of the Yellowstone National Park, was marked by one of the most extraordinary incidents in the annals of the American frontier.

Truman C. Everts, a former United States Assessor for Montana, was a member of the party. On September 9, he became separated from it and for thirty-seven days wandered in the Yellowstone wilderness.

Everts was wholly unfit to take care of himself in the wilderness. He was a city man, without experience in the wilds, timid, unresourceful, and very near-sighted. The first day he lost his glasses. The second day, while he was dismounted, his horse took fright and ran away with his traveling equipment. He tried for hours to capture the horse, but failed. Everts was left alone on foot in the rough country south of Yellowstone Lake, without food, gun, axe, blankets, or matches.

He went back to where he had fastened notes upon trees; but these had not been seen by his companions. By this time it was mid-afternoon. Toward evening he realized that he was completely lost.

Without food, fire, or shelter, he passed the night in the depths of a forest. There was a hard frost. Coyotes howled, and lions cried. His overwrought imagination conjured up endless terrors and dangers from the strange and ever-changing sounds of the wilderness.

On the third day out, Everts started off to follow, as he supposed, the direction taken by his companions, but took the opposite direction. He passed near numbers of animals. Finally he came to a small lake around which were many hot springs. In the water were many wild-fowl. He was starving, but had nothing with which to kill game. Fearful as he was of Indians, hunger led him to hope that he might meet them.

The loss of his eyeglasses was calamitous. Out in the lake he saw what he took for a boat coming to land, and he joyfully hastened to the shore to meet it. But when his "boat" took wings and transformed itself into a huge pelican, he was unnerved and almost lost hope.

At this lake he fortunately discovered a species of thistle with large edible roots, and these formed his principal sustenance for weeks. He took up the uncertain fight for primitive necessities. At the lake he became afraid, imagining that a mountain

lion was near. He climbed into a tree and remained there most of the night. When at last he descended, half frozen, a heavy September snowstorm was coming on.

To avoid freezing to death, he built a rude shelter of boughs over one of the hot springs. In the boiling water he cooked his thistle-roots. For several days he remained in this shelter; then, realizing that if he stayed longer he might perish in another storm, he traveled on.

Day after day, Everts hoped that his companions would find him. During two weeks they searched diligently, leaving small deposits of food at places where they thought he might pass. They fired guns, put up signs, and lighted fires on the heights; but the rough, wooded nature of the country, and Everts's near-sightedness, made these efforts unavailing. Reluctantly his friends gave up the search and went on; but when they reached a settlement they sent back a rescue party.

Necessity stimulates thought. The only

thing remaining in Everts's pockets was a little field-glass. Remembering that a lens would concentrate the sun's rays, he concluded that with his glass he might start a fire, and in this he succeeded.

Onward he traveled. If a day came with the sky overcast, he had to camp at night without a fire. To relieve the discomfort of this, for several days he carried a brand, but this burned his hands and smoked his eyes so severely, and so often went out, that at last he abandoned it and depended entirely upon the lens. One afternoon he stopped with the intention of building a fire. But the lens was missing. Almost exhausted, he dragged himself back to his last camp, and there, fortunately, the lens was found.

During a storm a benumbed bird fell into his hands, and he devoured it raw. In vain he tried to catch fish. As he stood on the margin of Yellowstone Lake, a gull's wing drifted ashore. This supplied his only satisfying meal. It was instantly stripped of its feathers, pounded between

stones, and boiled in a tin can which Everts had found. Hastily devouring the unsalted soup, he lay down and slept for several hours.

He had resolution and will-power, and greatly needed them. His stomach rebelled at thistle-roots. His mind wandered. He lost track of time. But his determination drove him on, though he was growing weaker each day. During the thirty-seven days he had traveled in a northerly course from south of Yellowstone Park to the summit of one of the bluffs, several miles to the east of Mammoth Hot Springs. Here, barely alive, he was rescued by two men of the final searching party sent out by his companions.

Everts not only recovered, but lived for thirty-one years after his terrible experience, dying at the age of eighty-five. One of the peaks in the Park, Mount Everts, is named for him.

The adventures of Colter and Everts are inspiring achievements. They give thrill-

ing views of primitive life, and are striking instances of men, empty-handed, successfully combating Nature. The stability, the will-power, the insistent, tenacious hopefulness of these men were extraordinary. Courageously they met and mastered the swiftly coming obstacles and afflictions that fate thrust thick and fast upon them. Their deeds are a part of our helpful heritage in the Yellowstone wonderland.

II

THE YOSEMITE NATIONAL PARK

On the western slope of the Sierra, about one hundred and forty miles east of San Francisco, lies the Yosemite National Park, with an area of 1124 square miles. It is slightly larger than Rhode Island. Its lower sections on the west have an altitude of about 3000 feet. From this elevation it rises through bold terraces into the High Sierra. Mount Lyell has an altitude of 13,090 feet; Mount Dana, 13,050 feet. Gibbs Mountain and a number of other peaks have slightly lower altitudes. The elevational range, then, of this one Park runs through 10,000 feet, or nearly two vertical miles.

It is one of the scenic wonders of the world. Within it are many attractions, each great by itself, and all more impressive in their splendid grouping.

Its glacial landscapes are magnificent and startling. Here the Ice King, the great landscape engineer, did work immensely bold and enchanting. An array of stupendous rock sculpture remains almost untarnished. Scores of lovely alpine lakes in solid rock lie open to the sun. The wild-flower population numbers more than a thousand varieties. It has scores of varieties of wild birds and many kinds of wild life. World-famous are its waterfalls.

Two of the greatest of mountain rivers rise in the Park and cross it from east to west. Each of them falls several thousand feet within the Park. Crossing centrally through the northern section is the Tuolumne. Passing miles of alpine rock and meadow, it roars through the rugged Tuolumne Cañon, and when well across the Park it sweeps through the majestic gorge known as the Hetch-Hetchy Valley.

Paralleling this stream at the distance of about ten miles is the intense Merced. This and its tributaries are signally rich

By permission of the National Park Service, Department of the Interior

BIRD'S-EYE VIEW OF YOSEMITE VALLEY LOOKING EASTWARD TO THE CREST OF THE SIERRA NEVADA

1. Clouds' Rest.
2. Half Dome.
3. Mount Watkins.
4. Basket Dome.
5. North Dome.
6. Washington Column.
7. Royal Arches.
8. Mirror Lake and mouth of Tenaya Cañon.
9. Yosemite Village.
10. Head of Yosemite Falls.
11. Eagle Peak (the Three Brothers).
12. El Capitan.
13. Ribbon Falls.
14. Merced River.
15. El Capitan Bridge and Moraine.
16. Big Oak Flat Road.
17. Wawona Road.
18. Bridal Veil Falls.
19. Cathedral Rocks.
20. Cathedral Spires.
21. Sentinel Rock.
22. Glacier Point.
23. Sentinel Dome.
24. Liberty Cap.
25. Mount Broderick.
26. Little Yosemite Valley.

in lakes and waterfalls, and they flow among stupendous and astounding glacial landscapes. At last the Merced flows serenely through the world-famous valley, the matchless Yosemite Gorge.

No name can suggest the amazing combinations of vastness and beauty seen in this rocky passage; the name "valley" is altogether lacking in significance. It may be described as having gorge walls with a valley floor. The walls have unshattered solidity, great height, and almost true verticalness. They bear the marks of individuality, and the valley-like floor shows original character.

The Yosemite Valley is obviously the greatest, as it is the most celebrated, scene in the Park. It is about seven miles long, approximately one mile wide, and about three fourths of a mile deep. The floor is nearly level and lies at an altitude of four thousand feet. It is well grassed, adorned with trees and groves, and glorified from end to end by the Merced River. The nearly

vertical walls rise mainly in smooth, substantial masses from twenty-five hundred to nearly five thousand feet. Waterfalls from the heights above make the wild plunge over the rim down to the floor of the valley.

This gorge is countersunk into a plateau. It extends from east to west. The western and open end has an impressive entrance. On the left, El Capitan raises his colossal figure thirty-three hundred feet in smooth and simple massiveness. On the right, over the front face of the mountain wall opposite, flutter several hundred feet of Bridal Veil Falls. Then in order, on the right south wall, Cathedral Spires rise high above the valley; then Sentinel Rock; then stupendous Glacier Point. Farther east on the south wall, Half Dome stands up forty-five hundred feet, the most impressive figure on the valley rim. Farther along, on the right or south side of the valley, is the celebrated Clouds' Rest. On the left or north wall stand the Three Brothers. By these

the snowy stream of the Yosemite Waterfall comes down. About halfway up the valley on the left are the Washington Column and the Royal Arches. Then, along the left or north wall in succession, rise North Dome, Basket Dome, and Mount Watkins. The upper part of the valley divides into three depressions or gorges. The north one is Tenaya Cañon, the central one is Little Yosemite Valley, and from this branches the southerly one, Illilouette Cañon. Each of these cañons is a wonder by itself.

Following is one of the most descriptive and eloquent tributes ever paid to this unrivaled array of stupendous nature statuary: —

> Every rock in its walls seems to glow with life. Some lean back in majestic repose; others, absolutely sheer or nearly so for thousands of feet, advance beyond their companions in thoughtful attitudes, giving welcome to storms and calms alike, seemingly aware, yet heedless, of everything going on about them. Awful in stern, immovable majesty, how softly

these rocks are adorned, and how fine and reassuring the company they keep: their feet among beautiful groves and meadows, their brows in the sky, a thousand flowers leaning confidingly against their feet, bathed in floods of water, floods of light, while the snow and waterfalls, the winds and avalanches and clouds shine and sing and wreathe about them as the years go by, and myriads of small winged creatures — birds, bees, butterflies — give glad animation and help to make all the air into music. Down through the middle of the valley flows the crystal Merced, River of Mercy, peacefully quiet, reflecting lilies and trees and the onlooking rocks; things frail and fleeting and types of endurance meeting here and blending in countless forms, as if into this one mountain mansion Nature had gathered her choicest treasures, to draw her lovers into close and confiding communion with her. (John Muir, in "The Yosemite.")

I. ICE-KING TOPOGRAPHY

The splendid scenic endowment of the Yosemite Valley, its stupendous architecture and vast sculpturing, its natural landscape engineering, are largely triumphs of the ice age. Many theories have been ad-

HALF DOME, YOSEMITE

vanced to account for the origin and the extraordinary features of this valley, especial prominence being given to subsidence, uplift, explosion, with earthquake modifications and influences of violent cataclysmic nature. Stream erosion has been strongly urged. All these theories attribute minor influences to one or more other factors.

The theory now generally accepted gives ice the leading part in the scooping of the valley and the creation of its wondrous forms. There is much evidence to support this conclusion. The ice theory is championed by John Muir, by Clarence King, and by F. E. Matthes. Matthes and Muir probably have made the most careful and exhaustive studies of the geological history of the valley.

This famous depression is of varying width. Examination of its walls shows that in the wider places it is composed of fissured rock that was more readily carried away by the ice than the adjoining unfissured rock-

sections. These resisting unfissured places jut into the valley.

Erosion by ice probably was preceded and somewhat guided by stream erosion. But this ice sculpture, the rock-forms and features wrought, must have been determined in a marked measure by the rock-structure. That is to say, the dense quality of the rock, the number and the position of the cleavage joints, or their absence in the rock, were factors that helped determine the rock-forms of Yosemite. Other factors since the ice age have altered or modified this glacial topography.

It is certain that a vast ice-stream poured over the walls and forced through this valley. This is shown in the rock-groovings and perched boulders high on the walls, and also by the massive moraine which dams the outlet of the valley. It appears certain that this must have been left when the ice vanished; and apparently it formed a lake that filled the entire valley nearly to the height of the dam. The lake finally

filled with sediment and sand, its surface corresponding approximately with the present surface of the valley. The valley floor is noticeably smooth, and its margins along the bottoms of the walls are comparatively free from rock-débris.

The landscape of the entire Yosemite National Park is preëminently glacial. Ice-polished mountains and hundreds of sculptured figures of vast size are a part of the matchless exhibit of the ice age in this wonderland. Polished domes predominate. Much of the rock-surface was dense granite comparatively free from cleavage lines, soft materials, or stratification. The forms made by the ice in these have endured. Since the ice age the softer and more fissured rocks have been far more changed by the various erosive forces than the more resistant rock of the domes and other sculptured forms.

Little Yosemite Valley is essentially similar to the Greater Yosemite in features and also in the manner of creation. Its

walls are from fifteen hundred to two thousand feet high, its length is about three miles, its width one half-mile. Its floor, like that of the Greater Yosemite, was for a time a lake. In origin and history, the Hetch-Hetchy Valley, too, is almost identical with the Yosemite.

Nature often changes the scene, often puts on a new landscape. The forces of erosion are steadily at work; most of them work slowly, but sometimes a change is wrought suddenly.

When the Sierra was first upheaved it was more or less tilted, terraced, and fissured. The surface was uneven. The present topography is the product of a long and complicated series of events. It has been wrought out by many erosive forces. It probably has been acted upon by two or more ice ages, but the last age shaped the splendid topography of the Yosemite that is attracting the world to the scene.

The eroding power of ice is determined by its thickness, that is to say, by its weight.

The small, shallow glaciers wear much more slowly than the deep ice-streams that bear heavily upon the surface passed over. The ancient glaciers of the region took on vast proportions. An enormous and deep ice-field accumulated from the snows of Mounts Dana, Lyell, Gibbs, McClure, Conness, and other peaks. Flowing westward, it came in contact with Mount Hoffman, against which it divided. The right section flowed down into the Tuolumne; the left, a branch about two miles wide, swept upward, climbing about five hundred feet over the pass and descending upon the Lake Tenaya region.

Apparently, five glacier streams united in the Yosemite Valley. They not only filled it but deeply overflowed the highest points on its walls. Passing out of the lower end of the valley, the united glacier was forced to climb upward several hundred feet.

About twenty-five small glaciers still remain in the Yosemite National Park.

There are about two hundred and fifty glacier lakes, mostly small. Others have filled with sediment and are hidden and forgotten. Lake Tenaya, the Lake-of-the-Shining-Rocks, has a surrounding of dense rock-masses that still show the rounded form and the high polish given by the ice.

2. TREES AND FORESTS

The tree growth and the forest arrangement in the Yosemite National Park are among the grandest of such features on the globe, and they form one of the chief attractions of this heroic realm. The trees grow to enormous size and are distributed and grouped with crags, meadows, terraces, cañons — all in unmatched wild, artistic charm and sublimity. Though some areas are covered with growths tall and dense, they are free from gloom, and everywhere one may walk freely through them. They are broken and brightened with numerous sunny openings. This splendid

landscape gardening extends over the greater portion of the Park.

The sequoia, the largest and most imposing tree, is found in the lower reaches of the Park. Other characteristic trees are the sugar pine, king of the pines; the Douglas spruce, king of the spruces; and the hemlock, one of the loveliest trees upon the earth.

The Park has three groves of Big Trees (sequoias) — the Mariposa Grove, the Tuolumne Grove, and the Merced Grove, all of the species *Sequoia gigantea*. The Merced and Tuolumne groves are near the western boundary of the Park, several miles north of El Portal Station, while the Mariposa Grove is in the southwestern corner, about fifteen miles southeast of El Portal. The Tuolumne Grove has but about thirty-five trees, and the Merced Grove fewer than one hundred.

The Mariposa Grove contains about five hundred and fifty trees. Among these is the Grizzly Giant, which, according to the

computation of Galen Clark, is six thousand years old. It has a diameter of nearly thirty feet and a height of two hundred and four feet. Evidently it was once much taller; its top probably was wrecked by lightning. Through the Wawona tree a roadway has been cut. A great number of these trees are between two hundred and twenty-five and two hundred and seventy-five feet in height. A few rise above three hundred feet.

In this Park are about thirty species of trees besides those above mentioned. Among them are a cedar and a juniper; two silver firs; yellow, lodge-pole, and six other species of pines. Among the broad-leafed trees are the oak, maple, aspen, laurel, and dogwood. There are forests of firs and lodge-pole pines.

The sugar pine grows to enormous size and has a noble appearance. Its cones are the largest produced by any conifer, occasionally reaching the length of nearly two feet. The yellow pine rivals the sugar

pine in size and grows from four to ten feet in diameter and from one hundred and fifty to two hundred and twenty-five feet high. Among the flowering shrubs are the dogwood, manzanita, California lilac, wild syringa, chokeberry, thimbleberry, and California laurel.

I have seen the trees diminish in number, give place to wide prairies, and restrict their growth to the border of streams; . . . have seen grassy plains change into a brown and sere desert; . . . and have reached at length the westward slopes of the high mountain barrier which, refreshed by the Pacific, bear the noble forests of the Sierra Nevada and the Coast Range, and among them trees which are the wonder of the world. (Asa Gray.)

3. PLANT LIFE

The Yosemite ferns, forests, and flowers are growing almost exclusively in glacial soil. Nearly all of the soil in the Park is rock-flour that was ground by glaciers, and in part distributed by them. Landslides and running water distributed most of the remainder.

The Park has an altitudinal range of nearly two miles, with them any climates, and consequently numerous varieties of flora. These are encouraged by varied life zones that result from combinations of sunny and shady mountain-sides, unevenly distributed moisture, and the different temperatures that prevail between the altitudes of three thousand and thirteen thousand feet.

Here and there in the Park wild flowers may be found in bloom every month of the year. Among the common flowers of the middle and lower sections are seen the shooting-star, evening-primrose, tiger lily, yellow pond-lily, Mariposa lily, black-eyed Susan, lupine, paintbrush, yarrow, and snow-plant. There are violets, blue and red, a number of pentstemons, the larkspur, golden-rod, several orchids, and the wild rose.

Many of the showy, crowded gardens of luxuriant wild-flower growths are in the moist fir forests. Among the tall flowers in

these gardens are columbines, larkspurs, paintbrushes, lupines, and one of the lily families. The famous, fragrant Washington lily brightens the open woods; in places it grows to the height of eight feet.

The snow-plant is a curiosity and attracts by its brilliancy of color. The plant and bloom are blood-red, but this herb is as cold and rigid as an icicle. It is not a parasite, but is isolated and appears to hold itself aloof from all the world. When caught by late snows it makes a startling figure, but it does not grow up through the snow.

In the alpine heights are many healthy plants: the lovely arctic daisy, phlox, gentian, lupine, potentilla, harebell, mountain columbine, astragalus, and numerous other bright flowers. They grow in clusters and in large ragged gardens, and in places are low-growing and extremely dwarfed.

Besides its wild small plants and the blooming shrubbery the Park has a glorious wealth of tree blossom. The hemlocks, pines, firs, and spruces have a jeweled

wealth of blue, purple, red, and yellow bloom.

May and June are the months most crowded with blossoms, but many come in the autumn, mingling serenely with the calm, sunny days, the evergreen groves, the tanned grass, and the masses of red and yellow leaves. In May and June the waterfalls are at their best, and the birds are most songful.

The Yosemite National Park is perhaps the most delightful region in all the world for the study of plant life. The wide variety of conditions here found, ranging from the hot and desiccated slopes of the brush-clad foothills to the cold, bleak summits above timber line, the abode of glaciers and perpetual snow, gives to the flora an exceedingly diverse and interesting character. Innumerable springs, creeks, rivers, ponds, and lakes provide suitable habitats for moisture-loving plants. Rocky outcroppings, enormous cliffs, and gravelly ridges accommodate species adapted to such situations. The irregular topography yields southward facing slopes which receive the full effect of the sun's rays, as well as northward slopes where the sun's rays are little felt, where it is

therefore cool, moist, and shady. The altitude ranges from two thousand five hundred feet in the foothill belt to thirteen thousand and ninety feet along the crest of the Sierra Nevada. All of these factors conspire to produce a remarkably varied and interesting vegetation.

The richness of this flora is indicated by the nine hundred and fifty-five species and varieties here described. The total number represented in the Yosemite National Park is considerably greater, since the grasses, sedges, and rushes are here omitted. Including an estimate for these, it is safe to assume that the number of species and varieties of flowering plants and ferns to be found within the one thousand one hundred and twenty-four square miles of the park is not less than about one thousand two hundred. ("A Yosemite Flora," by Harvey Monroe Hall and Carlotta Case Hall.)

4. THE REALM OF FALLING WATER

The Yosemite National Park is enlivened and splendidly enriched with mountain-high waterfalls and with wildly coasting and cascading streams. These world-famous falls gain an added attractiveness through the magnificence of the walls over

which they plunge. In places the walls, clean-cut and smooth, rise sheer for more than one thousand feet. Here and there the line of a wall is broken with a vast niche or columnar buttress.

A number of mountain streams and rivers in the Yosemite deliberately make their way to the brink of a vast gorge that has its brow in the sky, and there, in full self-control, they plunge over.

Jutting rocks, and smooth steep inclines throw streams into wild, uncontrolled excitement. But where a vertical river drops its fluttering current against a magnificent mountain-wall, everything is harmonious and controlled, and the stream appears to have the sublime composure of a Big Tree.

In a stream-channel water goes forward with crowding intermittent rushes. These, in plunging over a brink, break up into numerous closely falling rockets or comet-like masses, each tailed with spray. These in turn separate and divide into other such masses, with spray and water-dust.

UPPER AND LOWER YOSEMITE FALLS
Total fall 2600 feet

In a drop of several hundred feet a mass of water is likely to expand to several times its width at the brink. This expansion varies with the volume of water, the height of the drop, and the direction and speed of resisting wind-currents.

Swaying and bending are further attractions of waterfalls. Bridal Veil Falls often swings and sways gently from side to side. This movement is sometimes accompanied by lacy flutterings at one or more places on the spray-wreathed white fall. Numerous falls in the Yosemite are high and spread widely in descending, and frequently the fall dances splendidly as its white, airy mass keeps time to the changing movements of the wind.

Many of these high falls are accompanied at times by a fluttering of numerous rainbows. These flaunt, shift, and dart like great hummingbirds. At the Lower Yosemite, Bridal Veil, and Vernal Falls these rainbows sometimes momentarily form a complete circle of color. By these, too,

the moon produces similar though softer, stranger effects. Perhaps the most pleasing, delicate, and novel effects in lunar rainbows are to be had about the foot of Yosemite Falls.

The slender Ribbon Fall has a vertical drop of twenty-three hundred feet; the Upper Yosemite, about sixteen hundred feet. Nevada Falls is about six hundred feet high. Vernal Falls is one hundred feet wide at the top and drops three hundred feet. The Vernal and Nevada Falls are in the midst of magnificent and novel rock scenery. The Illilouette Fall is about six hundred feet high and is one of the most beautiful in the Park.

The Tueeulala and Wapama Falls in Hetch-Hetchy have their own individual setting and behavior. The Wapama, though lacking the verticality of the Upper Yosemite Falls, carries a greater volume of water. Yosemite Creek is a true mountain stream. In its first ten miles it goes through a number of zones, passes a variety

of plant life, and makes a descent of six thousand feet. One third of this descent is in the Falls of the Yosemite.

John Muir tells us that one windy day the Upper Falls was struck by an upward wind pressure that bent and drove the water back over the brow of the cliff. The wind held back the water so that the fall was cut entirely in two for a few minutes. But more wonderful than this was one day when the wind struck the Upper Falls at a point about halfway down and there stopped and supported its falling waters. For more than a minute the water piled up in an enormous conical accumulation about seven hundred feet high. All the while the water poured over steadily from above, and the entire mass rested upon the elastic but invisible air. Then came a wild collapse.

At the foot of some of these waterfalls vast ice-cones are sometimes formed. Occasionally these spread out over a large area and rise to the height of several hundred feet.

Among the numerous cascades in the Park, one of the most precipitous is the Sentinel, which endlessly comes tumbling down over a steep rough incline of thirty-two hundred feet. In the upper end of the Tuolumne Cañon the Tuolumne River rushes over inclined rocks and forms one of the most scenic rapids in the world.

5. SEEING YOSEMITE

I wish that all who visit the Yosemite National Park would have a view from the top of Mount Hoffman. I wish also that they might see Tuolumne Meadows, wander over the near-by alpine moorlands, and stand in the center of Hetch-Hetchy Valley.

Even the most flying visit to the Yosemite Valley should include a visit to Lake Tenaya, Little Yosemite, Nevada, and Vernal Falls, and, last, and in some respects most important, a view across and down into the valley from Glacier Point on the south side, and also from the summit of Eagle Peak on the opposite side.

LAKE TENAYA
YOSEMITE NATIONAL PARK

From the first, John Muir called Hetch-Hetchy the Tuolumne Yosemite and considered it a rival of the Yosemite Valley and "a wonderfully exact counterpart of the Merced Yosemite." It is less than half the size of the Yosemite, and its walls are about a thousand feet lower. Two immense rocks stand at the entrance. On the south wall is Koloma, a massive rock twenty-three hundred feet high. On the north wall is an almost sheer front of rock that rises eighteen hundred feet. Over this plunges Tueeulala Falls with a drop of ten hundred feet. This fall is somewhat like Bridal Veil, but excels it both in beauty and in height. Over the same wall, a short distance eastward, tumbles Wapama Falls, carrying a greater volume of water than the Yosemite Falls.

Like the Yosemite Valley, Hetch-Hetchy is a combination of stupendous rock-walls that rise from a quiet grassy valley which is beautiful with trees and groves and a clear mountain stream.

The Parsons Memorial Lodge at Soda Springs is an excellent stopping-place from which to explore the alpine scenes of the Yosemite National Park. It is owned by the Sierra Club, and was built in honor of Edward T. Parsons, who for years was one of the club's leading members. The Lodge is situated on the edge of the celebrated Tuolumne Meadows, by the Tioga Road, and is within a few miles of many celebrated scenes and view-points. It is about twenty-five miles northeast of the Yosemite Valley.

At Soda Springs, John Muir often had a central camp. He long ago recommended the place for an excursion center. It lies at an altitude of about nine thousand feet. One cannot too often see the near-by smooth, wide Tuolumne Valley with its surrounding world of mountain-peaks. It is in the very heart of the Yosemite High Sierra. By it is an extensive and splendid alpine zone. Here are lakes, moory spaces, polished pavements and domes, and, in its

lower regions, cañons, waterfalls, cascades, groves, and wild alpine gardens colored and made charming by dainty brilliant flowers. To the north lies Mount Conness; eastward, Mounts Dana, Lyell, Gibbs, Mammoth, and McClure; southward, the Cathedral Range; and westward ice-polished Mount Hoffman.

Surely the Parsons Memorial Lodge will become a world-celebrated rendezvous for mountain-climbers and for those who desire to see mountain scenery where it is peculiarly lovely and sublime. A number of trails converge at this point. It will be interesting to follow the future of the Lodge and to observe the thousands of enthusiastic people who will enjoy the surrounding scenes.

About twelve miles to the west of it is Mount Hoffman, which rises near the center of the Park and is probably the most commanding view-point in it. This is one of the places that visitors to the Park should not fail to enjoy.

Only a few miles to the southwest of the Lodge is Cathedral Peak. This imposing ice-burnished structure is one of the most celebrated pieces of nature statuary in the Park. Near by is Cathedral Lake. About fifteen miles to the south of the Lodge is a region of burnished rocks, numerous lakes, cañons, and moraines — a wonderful array of glacial stories. This region is several miles southwest of Mount Lyell.

Mountain-climbers will find Dana Mountain, to the east of the Lodge, an excellent view-point. To see a sunrise from it is a rare enjoyment. From its summit one looks down on the Mono Desert, the lake, and the craters. It is an easy one-day journey from the Lodge across Tioga Pass to Mono Lake.

At the door of the Lodge are the magnificent Tuolumne Meadows. There are a series of them, the lower one being about four miles long and about half a mile wide. Its meadowy expanse is in places attractively sprinkled with trees, and across it,

with beautiful folds and hesitating bends, lingers the Tuolumne River.

The wonderful rapids in the upper end of the cañon of the Tuolumne are perhaps the greatest in the world. The white and rushing river is intensely impressive. Some distance below the Lodge begins the Big Tuolumne Cañon. It is eighteen miles long and terminates in the Hetch-Hetchy Valley. A journey through this is a joy for the mountaineer. The cañon is comparatively narrow for its depth, which in places is one mile. There are a few romantic parklike openings along the way, and at some points the statuary is stupendous and magnificent.

6. HISTORY OF YOSEMITE

Indians formerly called the Yosemite Valley *Ah-wah-nee*, meaning "grassy valley." Early one morning a young brave started for Mirror Lake to spear fish. On the way he encountered a huge grizzly bear. He fought the beast with his spear and a club. After a long and furious battle, in

which he was badly wounded, the bear was killed. For this exploit the Indian was named Yosemite, which means a full-grown grizzly bear. This name was transmitted to his children and eventually given to the entire tribe of Indians inhabiting the valley.

The Yosemite Valley was first made known to the public by Major James D. Savage and Captain John Boling, who discovered it in 1851. Joseph R. Walker, frontiersman and explorer, claims to have discovered the valley in 1833.

Tourist travel to the valley began in 1857. It became a state park in 1864, and in 1890 a National Park was made around it. In 1905 the boundaries were changed, and in 1906 a vigorous state and national campaign was waged, under the leadership of John Muir, the Sierra Club, and Robert Underwood Johnson, which resulted in the entire region becoming a National Park.

John Muir enjoyed telling of the experience of an English gentleman who years

ago made a trip to the valley. Journeying from the railroad on horseback, he missed the way and spent a long day descending into gulches and cañons, then climbing out upon the high ridges. At last, late one evening, he arrived on the rim of the Yosemite. After a swift glance down into the valley, he exclaimed, "Great God! have I got to cross this too?"

John Lamon, a roving Westerner, was the first settler in the Yosemite Valley, where in 1859 he built a cabin, made a garden, and planted fruit-trees. He was so charmed with the scenery and the climate that he quit his roving life and here made his home till his death in 1876.

The Hetch-Hetchy appears to have been discovered in 1850 by a hunter named Joseph Screech. In 1903 the San Francisco supervisors applied for permission to make commercial use of the valley by building a dam and making of it a reservoir. John Muir and the Sierra Club led the opposition to this. The fight went on for ten years with

uncertain results. At times it was intense and bitter. Congress finally decided in favor of San Francisco, but up to this date San Francisco has not complied with the conditions imposed.

In 1915 plans were made for the improvement of the Yosemite Village. In the same year occurred an event of greater importance for the Park. Chiefly through the efforts of Stephen T. Mather, the disused Tioga Road became a part of the Yosemite road-system. This road has been reopened and will be a great advantage and convenience to Yosemite visitors. It extends across the Park from east to west, passing near the Big Trees, the Parsons Memorial Lodge, and Tuolumne Meadows, invading the High Sierra, and crossing the range through Tioga Pass. Henceforth automobilists from the East may leave the main continental highway in Nevada and reach the Yosemite Park *via* Mono Lake and this road.

The name of Galen Clark is pleasantly

interwoven with the history of the Yosemite National Park. John Muir thus described the man: "The best mountaineer I ever met, and one of the kindest and most amiable of all my mountain friends. . . . His kindness to all Yosemite visitors and mountaineers was marvelously constant and uniform."

Galen Clark enjoyed showing people of all ages the various wonders of Yosemite Valley, never tired of answering questions, and endeavored carefully to explain the facts concerning each point of interest. Thousands of visitors to the valley came to know him intimately. He came to the Park to live in 1857, and for more than fifty years it was his permanent home. For twenty-four years he was a member of the Yosemite State Park Commission. The Indians of the valley were fond of him, and from them he gathered much interesting information. His serene disposition and his almost constant outdoor life kept his body and mind normal to the day of his death.

After he reached the age of ninety, deciding to become an author, he wrote and published three little books relating to the Indians and to the natural wonders of the Yosemite National Park.

III

THE SEQUOIA AND THE GENERAL GRANT NATIONAL PARKS

The Sequoia National Park has a crowded luxuriance of wild flowers. It abounds in varied bird-life and has a number of wild sheep, bears, deer, and other animals. It has lakes, cañons, and glaciated mountains. But the supreme attraction of this and the neighboring General Grant Park is the sequoia or Big Tree. Nowhere else on earth are trees found that are so large or so imposing. In places the Big Trees are attractively mixed with other forest trees. Besides the large aged trees, there are middle-aged ones, young trees, and seedlings.

The General Grant Park has a sequoia that is thirty-five feet in diameter. This Park, like the Sequoia, was established principally to preserve Big Trees. Both

became National Parks in 1890, chiefly through the efforts of George W. Stewart. The General Grant Park has an area of four square miles, the Sequoia Park of two hundred and thirty-seven square miles.

The proposition to enlarge the Sequoia National Park should meet with early consummation. The region would then embrace about twelve hundred square miles, including the present General Grant and Sequoia Parks and Mount Whitney, the highest peak in the United States, exclusive of Alaska. Near Mount Whitney are a number of other peaks. In fact, the region is the highest and most rugged section of California.

Says Gilbert H. Grosvenor, editor of "The National Geographic Magazine": —

> Switzerland, the playground of Europe, visited annually (until 1915) by more than one hundred thousand Americans, cannot compare in attractiveness with the High Sierra of central California. Nothing in the Alps can rival the famous Yosemite Valley, which is as unique as the Grand Cañon. The view from

the summit of Mount Whitney surpasses that from any of the peaks of Switzerland. There are no cañons in Switzerland equal to those of the Kern and the King Rivers, which contain scores of waterfalls and roaring streams, any one of which in Europe would draw thousands of visitors annually. Many of the big yellow and red pines, of the juniper and cedar, eclipse the trees of Switzerland as completely as these pines are eclipsed by the giant redwoods.

And then, as to birds and flowers, the High Sierra so excels the Alps that there is no comparison. Never will the writer forget the melodies of the birds and the luxuriance of the meadows passed in the marches from Redwood Meadow to Mineral King, and then up over Franklin Pass; the fields of blue, red, yellow, orange, white, and purple flowers, all graceful and fragrant, or the divine dignity of the great Siberian Plateau, nearly eleven thousand feet above the sea, and yet carpeted from end to end with blue lupine and tiny flowers.

From the educational point of view, the High Sierra so surpasses the Alps that again no comparison can be made.

Magnificent is the King's River Cañon. The Kern River Cañon is seven thousand feet deep; this is equal, if not superior, to the depth of the Grand Cañon of the Colo-

rado. Here is the celebrated Tehipitee Dome. There are numerous lakes, streams, waterfalls, and meadows. This was the original home of the golden trout. Besides the King's and Kern Rivers, there is the Kaweah.

The glaciation of this region is on a stupendous scale and is of extraordinary interest. The peculiar topography, the heavy snowfall, and the character of the rocks all combined to cause the Ice King to execute wonderful works in this Park and to leave behind a splendid record. From the summit of this high region one looks into Death Valley, less than one hundred miles away, which is the lowest point in the United States, a section of it being three hundred to four hundred feet below sea-level. This region includes the southern extension of the High Sierra in California, is near the Nevada line, and is about one hundred miles north of Los Angeles.

Clarence King, the distinguished geologist and first Director of the United States

Geological Survey, had a number of mountain-climbing experiences in this Greater Sequoia region. These are tellingly related in that classic volume, "Mountaineering in the Sierra Nevada." John Muir also wrote of this region, and it seems fitting that this enlarged reservation should be called the "Muir National Park."

Here the skies and the weather are great changing attractions, and the big wild folk are alert neighbors. Here are forests made up of trees each of which is an heroic giant! Here the Ice King left vast and splendid stories. Here is perhaps the deepest gorge in this round world, and here the highest peak within the bounds of the States of the Union — a peak that commands vast and varied scenes. The streams and lakes are of the greatest. The variety of wild flowers is probably not equaled in any other park or territory. The birds, too, are numerously and abundantly represented.

If I were sentenced to end my days in a National Park of my choosing, without the

least hesitation I should choose the region now proposed for the Greater Sequoia or Muir Park.

THE BIG TREES

The General Sherman is the largest tree on earth, and it may be the oldest living object that has a place in the sun. It is thirty-six and one-half feet in diameter and two hundred and eighty feet high. Nearly as large are the General Grant and the Grizzly Giant. A number of veteran sequoias are more than thirty feet in diameter and nearly three hundred feet high. Many are more than twenty feet in diameter, and thousands have a diameter of ten feet or more.

The Big Tree (*Sequoia gigantea*) is scattered in thirty-two groves along the western slopes of the Sierra for a distance of two hundred and sixty miles. Most of the trees are between the altitudes of five thousand and eight thousand feet. There are gaps of miles between groves. The south-

THE FOUR BROTHERS
SEQUOIA NATIONAL PARK

ern extension has a continuous forest for seventy miles, except where it is cut in two by cañons, and it contains a majority of all Big Trees. There are three Big-Tree groves in the Yosemite National Park, one in the General Grant, and twelve in the Sequoia. One of these twelve is the famous Giant Forest.

The Sequoia and General Grant National Parks have more than a million Big Trees. Of these, more than twelve thousand are ten or more feet in diameter. A few of these trees are upwards of three hundred feet high, but the majority are about two hundred and fifty feet.

Galen Clark, who made a long and careful study of the Big Trees, expressed the opinion that the Grizzly Giant was at least six thousand years old. A number may be four thousand or more years of age, but the majority probably are less than three thousand. Careful counts of the annual rings of trees that have been felled show that a number of these had lived more than three

thousand years. One had more than four thousand annual rings. W. L. Jepson, author of "The Trees of California," believes that the general tendency is to exaggerate the age of the living Big Trees.

These trees bear seeds each year. In a fruitful year a Big Tree may produce one million seeds. These are exceedingly small and light. The tree blooms in late winter, while the earth is still covered with snow. The flowers are pale green and pale yellow. The cones are bright green and are about two and one-half inches in length. They shed their seeds as soon as they are ripened, but the cones sometimes cling to the trees for months. If the seeds alight on freshly upturned soil or soil recently burned over, they usually sprout and grow vigorously. They do best in the sunlight. But if the seeds fall upon a grass- or trash-covered forest floor, they fail to sprout.

With branches nearly to the earth, the outline of a young tree is that of a slender pyramid. As the tree ages, the lower

branches fall off. In middle-aged trees, the trunk commonly is free of branches from fifty to one hundred and fifty feet above the ground. The tiptop of aged trees usually is a dead snag, surrounded by living, up-curved side branches from the trunk. The original tops of nearly all old trees have been smashed by lightning.

Usually in young trees the bark is almost purplish; in old ones it is cinnamon-color. This bark is fire-resisting, is from one to two feet thick, and is good protection to the vitals of the tree. The roots are short, but the base of the trunk is heavily, artistically buttressed.

Living or dead, the Big Tree has extraordinary durability. It has exceptional vitality and recuperative power. Its long life probably is due to the fact that it is almost immune from insect pests, the most deadly enemies of all other kinds of trees. Men, fire, and lightning are the worst enemies of the Big Tree. Most of the old ones have had their heads shattered by lightning

again and again, but they still insist on living and will produce a new top even though the old one is entirely smashed off. These trees appear to be almost immortal. Unless they starve or meet a violent death, they live on and on.

John Muir says that the wood in the Big Trees has an endurance almost equal to that of granite, and gives the following illustration. He cut a piece of sound wood from the trunk of a fallen monarch that had been lying upon the earth several hundred years. In falling, the trunk of this Big Tree was cracked across in a number of places. Into these cracks fire ate its way each time a forest fire swept the locality. Each of these fires probably was separated from the following one by a number of years, and it probably took a great many burns to cut this slow-burning wood into sections. But at last this was done. Between the ends of two of these sections a fir tree took root and grew. After all these years, and after the fir tree had lived three hundred and eighty

years, the sections of the Big Tree still lay upon the ground, apparently as sound as the day the tree fell.

All Big-Tree groves appear to have gone through forest fires. It is probable that most of these groves have been repeatedly fire-swept. Many of the trees show fire-scars that cannot be entirely healed for centuries.

The Big Tree has been called the noblest of a noble race. Its enormous size, its excellent proportions, its serenity, its steadfastness, its age, make it the most impressive living object. John Muir, in commenting on the imperishable nature of the sequoia, says he feels confident that if every one of these trees were to die to-day, numerous monuments of their existence would remain available for the student for more than ten thousand years.

But the Big Tree is not verging toward extinction. Its greatest danger is from general destruction by man. The Big-Tree area has not diminished, but probably has

slightly increased in the last few thousand years. Seeds sprout readily and young trees grow vigorously. John Muir thus comments concerning the tree and its distribution:—

> The Big Tree (*Sequoia gigantea*) is Nature's forest masterpiece, and, so far as I know, the greatest of living things. It belongs to an ancient stock, as its remains in old rocks show, and has a strange air of other days about it, a thoroughbred look inherited from the long ago — the auld lang syne of trees. Once the genus was common, and with many species flourished in the now desolate arctic regions, in the interior of North America, and in Europe, but in long eventful wanderings from climate to climate only two species have survived the hardships they had to encounter.

The Big Trees probably were discovered by General John Bidwell in 1841. John Muir studied them for years, and then gave to the world an accurate account of them.

The Big-Tree groves, he says, are growing in the soil-areas off which the ice first melted at the close of the ice age. The wide

gaps between the various sequoia groves were areas occupied by the large and long-enduring glaciers. The topography of the mountains plainly shows that the areas where the groves are were places protected from the ice-flows of the heights. The gaps would naturally have received the main ice-flows from the heights.

In the south the Big-Tree forests are in the areas that were effectively buttressed and shielded from ice-flows. Consequently these areas were early opened at the close of the ice age. The forty-mile-wide gap between the Stanislaus and the Tuolumne Groves was a channel filled with a glacier probably long after the groves to the north and the south started to grow.

Did the sequoia endure the long ice age in these few places where the groves are now growing? The pine, fir, spruce, and other forest species in the Sierra may have been planted with seeds from trees that survived in the south. But as the sequoia is found nowhere else, the question arises, did

it survive somewhere near the localities in which it is now growing?

An acquaintance with the Big Trees, an understanding of them, gives us one of the most impressive and lasting ties to be had in nature. These trees ever impress one with a nobility of character. Seen at midday, or at early morning when their lengthened shadow gives strange tones to the scene, or in the serene, strange moonlight, or when, wrapped in restless mist, they loom vast and mysterious, or in a storm, they are ever marvelously steadfast and calm. Long may they live!

At the Big Trees, the first act of Horace Greeley, the celebrated editor, was to take out a pencil and figure on the lumber contents of one. These veteran trees have a higher value.

Lincoln, in his lecture on Niagara Falls, said: "The mere physical fact of Niagara Falls is a very small part of the world's wonder. *Its power to incite reflection and emotion* is its greatest charm." Lincoln

might have calculated the mule-power of the Falls if ruined — changed from the higher value of a scenic spectacle to common commercialism. Why tell how many hovels or how many feet of sewer might be constructed out of the Library of Congress; or the number of cobblestones that could be manufactured from the Washington Monument? As well tell the number of forts that might have been built with the marbles and the energy that were put into statuary and the inspiring arts, as to consider or measure Big Trees in lumber terms.

The sequoia is one of the monumental wonders of this round world. It is the oldest settler — the pioneer of pioneers. Each venerable giant numbers his years by centuries. Each was already old when nations of the present were born. Gone and forgotten are the nations that were — gone the flags that waved in the wind when these trees began to cast their shadows.

And it may be — for nations with all

their pomp and pride are short-lived — that every flag that now flaunts the sky, that every nation now on earth, will pass out of existence long before these patriarchal trees lie down at last upon the mountains. Some of these trees have already out-lived more than fifty generations of mankind. Some of them are likely to look upon a score or more of passing generations of the human race. These trees might tell a thousand stirring stories to the one possessed by the Sphinx. The Sphinx is of lifeless stone. These trees are alive. They have lived through countless changing scenes. But which shall be accounted the more striking and wonderful, the passing pictures in the centuries they have looked upon, or the moving, changing scenes in the centuries that they are yet to see?

These Big Trees have endured fire, flood, lightning, landslide, gale, drought, and earthquake, but have never hauled down their evergreen banners. They have triumphed over the changes of ten thousand

seasons; watched and waved through centuries of sunlight and storm. Countless times the sun has projected a silhouetted shadow of their stupendous plumes against the mountain side. They have worn monumental robes of snow flowers; they have stood silent in the light of thousands of autumn moons; and they are still upon the heights to inspire us with their steadfastness and their splendor.

The landmark and the heritage of the ages are these splendid trees, these immortal evergreens. Their historic lore and unequaled grandeur give them amplitude and poetry enough to kindle and enrich the imagination. Let them live on; they will bless those who make the sacred pilgrimage to see them, and they will be a "choir invisible" to all who simply know that upon the sublime Sierra they still wave grandly.

IV

MOUNT RAINIER NATIONAL PARK

MOUNT RAINIER is one of the noblest and most imposing mountains in the world. It stands isolated. Around it are countless peaks, but these are so small that they but emphasize the colossal bulk and towering height of majestic Rainier. It is 14,408 feet high. The altitudinal sweep of the Park is ten thousand feet. Only Mount Rainier territory is in the Park. The area is three hundred and twenty-four square miles — about eighteen miles square. Yet so vast is this mountain that an extensive part of it is outside the Park boundaries. Its outline is intensified by the extraordinary make-up of black and white which characterizes it. The upper half of it is strangely white with masses of snow and ice. The lower slopes are purplish black with dense coniferous forests. Between the snow and

the forest is a magnificent belt of wild flowers.

Mount Rainier is a sleeping volcano. Beneath its shell of stone is a heart of fire. Upon this shell are snow-fields and glaciers, rushing rivers, a stupendous forest, wild-flower gardens in which millions of "bannered blossoms open their bosoms to the sun."

Additional territory is needed to protect scenery not now in the Park, and especially for Park road development. At a number of points along the southern boundary the road winds outside the Park. A similar condition will exist on the eastern side when the eastern road-system is built. Much good would result from starting at the southeast corner of the Park and adding a six-mile strip twelve miles long on the south and another strip of equal size on the east.

Mount Rainier lies about sixty miles eastward from Seattle and Tacoma. An excellent automobile road enters the southern boundary and extends into the Park,

passing the snout of the Nisqually Glacier. The road-plan of the Park embraces an encircling scenic highway around the mountain on the lower slopes. This road is to be united with entrance roads from the north, south, east, and west. A trail about fifty miles long circles this peak near timber-line. It penetrates fifty miles of unexcelled beauty and splendor. It touches a thousand different scenes and ever commands the world of light and shade that lies far below and far away.

Small inns are to be built along this wilderness way. What a poetic, scene-crowded way to travel! Every boy and girl might well plan to walk round mighty Rainier on this commanding circle pathway.

The uppermost edge of Rainier's dark primeval forest ends at timber-line in peninsulas, bays, and islands. Between the ragged edges of the forest and the broken edges of the ice and snow is a magnificent wild-flower scenic belt, or zone, a mile or

STAGE ROAD, MOUNT RAINIER NATIONAL PARK

two in width. Mingling are ice, snow, broken groves, brilliant wild flowers, streams, crags, meadows, and a thousand cascades. Through this scenic zone lies the timberline trail.

Steam is constantly issuing from the craters in the summit. During the last century, there were a number of slight eruptions, the most recent one occurring in 1870. Indian legends tell of a great cataclysm during which the summit of the mountain was blown to pieces and scattered afar. Apparently the peak, before this explosion, was about two thousand feet higher than at present. The shattered summit indicates the reality of this traditionary explosion and previous height. It is three miles across the summit. A part of the great crater-rim still remains, and Liberty Cap and Peak Success strongly testify to former elevation and grandeur.

Often this splendid peak wears a vast wreath or belt of clouds or mists. Visitors to the middle slopes frequently have the

delightful experience of being above the clouds. François E. Matthes, the well-known geologist, thinks this mountain a wonderful source of inspiration and wishes that it were possible for all people to share it. He says, "No doubt the time will come when a pilgrimage to Mount Rainier shall be esteemed among the most precious joys, the most coveted privileges which a citizen of this country may hope to realize for himself or for his fellows."

George Vancouver, the explorer, discovered Mount Rainier in 1792. It was named in honor of Peter Rainier, an English admiral. Theodore Winthrop, author of that classic book of travel, "Canoe and Saddle," visited the region in 1853. He was an ardent advocate of the original Indian names of conspicuous objects of interest. The Indian name for this peak was Tahoma. It is encouraging that the people of Seattle and Tacoma may early unite to ask that this name be adopted. Said Mr. Winthrop in "Canoe and Saddle": —

Let us, therefore, develop our own world. It has taken us two centuries to discover our proper West across the Mississippi, and to know by indefinite hearsay that among the groups of the Rockies are heights worth notice.

Farthest away in the West, as near the western sea as mountains can stand, are the Cascades. Sailors can descry their landmarked summits firmer than a cloud, a hundred miles away. . . . Kulshan, misnamed Mount Baker by the vulgar, is an irregular, massive, mound-shaped peak. . . . South of Kulshan the range continues dark, rough and somewhat unmeaning to the eye, until it is relieved by Tahoma.

Mount Tahoma was first climbed in 1870 by General Hazard Stevens and P. B. Van Trump. The first woman to climb it was Miss Fay Fuller, who went to the summit in 1890. The Indians appear not to have climbed above the snow-line. They had little occasion to go higher, and they believed that the god of the mountain forbade their ascending farther.

In 1883, Henry Villard, president of the Northern Pacific Railroad, sent a large party to enjoy the scenes on the slopes of

Mount Rainier. Among those in the party were James Bryce, afterward British Ambassador to the United States, and Bailey Willis. These two gentlemen appear to have discussed the importance of having this peak set aside as a National Park. On the completion of this excursion, James Bryce and others recommended to Henry Villard that efforts be made to have this Park created. Later, similar requests were made by individuals and organizations, and a recommendation to this effect was made in writing by the National Academy of Sciences. In 1899 the Park was established.

1. THE SPLENDID WILD-FLOWER GARDEN

The triumphant glory of Mount Rainier National Park is seen in its wild flowers. It is doubtful whether anywhere else on earth is to be found so extensive and luxuriant a growth of such brightly colored flowers amid such scenes of supreme wildness and grandeur.

A vast broken flower-belt encircles the

peak between the ragged lower edge of the large ice-fields and the ragged upper limits of tree growth. A flower-belt fifty miles long, covered and crowded with flowers, mile after mile! It is most showy and splendid at and just above the limits of tree growth. Masses of color; myriads of blossoms, each of clean and vivid hue! This vast and splendid garden is crossed with streams and cañons, adorned with crags, green meadows, forested peninsulas, and islands of groves. This encircling flower carnival expands into numerous connected and disconnected alpine parks. Each park is a superb flower-garden with a splendid precipitous alpine back- and sky-ground. Among the more striking of these are Paradise Park, Indian Henry's Hunting Grounds, Spray Park, and Summerland.

In the open upper reaches of the forest, the fragrant twin-flower covers and crowds wide places. There are thousands of cream-white mountain lilies — bear-grass — with tall, slender blooms. The shooting-star, a

near relative of the cyclamen, is as thick upon the earth as stars up in the sky. Thousands of purple asters are found upon stalks two feet high. A dogtooth violet, commonly called avalanche lily, is abundant. The western anemone, with its exquisite leaves, its purple bloom and decorative seed plumes, adorns many a wild garden. Many of the plants in the high altitude grow rapidly, bloom briefly, and seed quickly. Summer is short.

Acres of valerian with four-foot stalks thrust their pungent blooms beneath one's nose. The blue mertensia crowds moist places with a thicket of stalks three feet high. A lavender-colored arctic lupine grows in decorative masses. The white dock, sometimes called wild buckwheat, nods on its slender stalks two feet above the earth. The wild hellebore carries its greenish-white flowers upon stalks as high as one's head.

Many of the yellow or golden flowers bloom close to the earth. There are golden

MOUNT RAINIER FROM PARADISE VALLEY

asters and golden-rods, a mountain dandelion, a low-growing yellow buttercup called the monkey-flower, the gold-touched arnica, and yellow potentilla. These fill many wide, ragged places with a blaze of yellow glory.

Low-growing lavender-colored phlox appears in masses, and Cusick's speedwell forms large patches of low-lying blue. Epilobiums cover acres of earth with pink petals.

A species of blue gentian grows in showy clusters, and meadows are filled with the brightest painted-cups in red and crimson. The heather, the heather! There are rich, deep masses of red, white, and yellow heather. The white heather is the lovely cassiope that adorns the snow edges of thousands of mountains from Mexico to the Arctic regions.

Endless are the ranks of the saxifrage family in white; countless the numbers of the pink family. Here the spring beauty blooms in summer and the rose-crimson

Pentstemon rupicola makes a showy appearance.

Also above the limits of tree growth are other little plant people: the ever-cheerful kinnikinnick; a dainty, tiny fern; numerous members of the figwort family; Lyall's lupine, with its brilliant bloom of purple flowers; the evening-primrose; and a most pungent polemonium.

Growing far up the slopes is an attractive member of the dock family that is tufted with purplish-yellow bloom. A yellow mustard (*Draba aureola*) and another member of the mustard family with creamy-white flowers carry and maintain this wonderful wild-flower garden farthest above the clouds, highest up into the snow-fields and the sky.

One day I found a tiny tuft of bloom in a bit of soil on the very summit of Rainier. It was in a niche of lava, surrounded with ice and snow, but warmed by the steadily escaping steam. Brave, cheerful little fellow creature! In a steamy, ice-rimmed

volcano's throat on a desolate top of the world!

Of all the fire-mountains which, like beacons, once blazed along the Pacific Coast, Mount Rainier is the noblest in form. . . . Its massive white dome rises out of its forests, like a world by itself. . . . Above the forests there is a zone of the loveliest flowers, fifty miles in circuit and nearly two miles wide, so closely planted and luxuriant that it seems as if Nature, glad to make an open space between woods so dense and ice so deep, were economizing the precious ground, and trying to see how many of her darlings she can get together in one mountain wreath. . . . We wade knee-deep and waist-deep, the bright corollas in myriads touching petal to petal. . . . Altogether this is the richest subalpine garden I ever found, a perfect floral elysium. (John Muir, in "Our National Parks.")

The forests of this park are a splendid attraction. The trees are tall and of noble proportions. The forest floor has a tangled undergrowth of vines and shrubbery, a luxuriant carpet of ferns, mosses, and flowers. Many areas are crowded with trees from two to eight feet in diameter, from

one hundred to two hundred and fifty feet high. Cedars, spruces, and hemlocks number their years by centuries. A few are perhaps a thousand years of age. Theodore Winthrop wrote of these forests: —

> Long years of labor by artists the most unconscious of their skill had been given to modelling these columnar firs. Unlike the pillars of human architecture, chipped and chiselled in bustling, dusty quarries, and hoisted to their site by sweat of brow and creak of pulley, these rose to fairest proportions by the life that was in them and blossomed into foliated capitals three hundred feet overhead.

The forest is gloomy with luxuriant greenness. Many trees are shrouded with a pendent lichen, *Usnea.* This hangs in long, threadlike tufts, while beneath it, mingling with the flowers among the towering trees, are forests of far-spreading ferns.

Around the foot of the mountain are the Indian-pipe and the pyrola, of the wintergreen family; and there is still another

delightful member of this family, whose generic name means "delight." The dogwood (*Cornus canadensis*), the forest anemone, the dainty calypso are also here. All these and numbers of other brilliantly colored species brighten and in places illuminate the somber forest floor like touches and dashes of sunlight.

On the lower slopes Douglas spruce and Western hemlock predominate, with red cedar along the streams. Above the altitude of three thousand feet, noble and silver firs are found singly and in solid groves. Ascending, we find a scattered growth of lodge-pole, growths of Engelmann spruce, and a few white-bark pines.

The timber-line may be given as about sixty-five hundred feet, or at the same altitude as in the Alps. The extreme height of the tree growth is about one thousand feet greater. Most of the timber-line growth is crushed, flattened, and oppressed. The timber-line grouping is most poetical and picturesque. In places the

trees are both dwarfed and distorted with wind and snow. The trees are mountain hemlock, alpine fir, Engelmann spruce, and white-bark pine. These stand singly, in groups, and in ragged groves. Commonly they stand in green meadows or brilliant wild-flower gardens. Here and there they are separated with the green tracks of permanent snowslides.

The Mount Rainier National Park has its full share of bird and animal life. Here are numerous warblers and woodpeckers; chickadees, black-hooded jays, dainty hummingbirds, ptarmigans, thrushes, and trustful water-ouzels.

Among the animals is that audacious climber, the mountain goat. There also are deer, elk, bears, and other alert wild folk.

2. GLACIERS OF MOUNT RAINIER

Mount Rainier has the largest and the longest glacier in the United States. This is the Emmons. It is about six miles long

and has an area of about eight square miles. It is on the eastern slope of the peak. The ice-area on Rainier covers one seventh of the Park, or about fifty square miles.

Rainier has a magnificent glacial system. There are a dozen large and twice as many small glaciers. The peak is an enormous cone with a blunt, broken top. A majority of the large glaciers begin two thousand or more feet below the summit and extend in a comparatively straight line toward the bottom. Though a number unite in continuous ice-fields well up the slope, down the slope each generally is separated from its neighbors. The glaciers are separated by narrow ledges called cleavers, or by each occupying its own deep cañon. Near the terminus many are separated by moraines or flowering meadows.

The Nisqually Glacier, which ends just below the altitude of four thousand feet in Paradise Park, is five miles long. In the summer-time it moves forward at the rate

of about sixteen inches per day. This, and in fact all glaciers, have periods of advance and retreat. During the last twenty-five years this glacier has retreated about one thousand feet. That is to say, the present point where it melts entirely away is one thousand feet farther up the slope than it was twenty-five years ago. In comparatively recent times, as the cirques, lakes, and moraines far down the slopes show, the glaciers on this peak were deeper and larger, and reached much farther down the slope than at present.

The Nisqually Glacier has continuous connection with the snow deposits upon the summit of the peak. At one point this snow comes down a precipitous cascade and tumbles perhaps two thousand feet. This and all other glaciers are clean and snowy at the upper end, but the lower end is greatly darkened with rock-débris and earthy material that have mixed with it. The last half-mile of the Nisqually Glacier has the appearance more of a rock glacier

than an ice glacier. Its front is a dark chocolate color.

The Paradise Glacier is one of several on the southerly slope. It is formed by the union of a number of ice-streams which originate at about nine thousand feet. They do not receive snow from the slopes above, but quantities of snow are brought to them by the wind. Near the lower end, this glacier divides into a number of lobes or streams.

The Carbon Glacier descends the northerly slope. It originates in the large cirque or ice-made cañon on the peak. This is a mile and a half across, and its terminal wall rises precipitously thirty-six hundred feet. Its snow supplies fall upon it from the clouds, are swept to it by the winds, and rushed to it by avalanches.

The Winthrop Glacier is on the northern slope. Among its interesting features are ice-cascades, glacier tablets, and the ice flowing over high mounds in its main channel.

The Tahoma glaciers on the southwest slope exhibit a glacier island.

The Kautz Glacier on the southern slope is long, narrow, and winding. It has an enormous medial moraine. Pyramid Rock commands an excellent view of this and other scenes.

Many admirable names have been selected for the objects of interest on Rainier. In this connection, some one is to be thanked for substituting "cleaver" and "wedge" for "arrête."

The snowfall on the peak is heaviest on the lower slopes. This diminishes with altitude and is lightest on the upper slopes and the summit. This is typical of mountain snowfalls. From long experience in the Rocky Mountains, I am able to say that the snowfall there is much less on the high peaks than on their middle slopes. The same fact applies to the Sierra Nevada of California, to the Andes of South America, and to the Himalayas and the Alps. It is common for a storm-

cloud to be comparatively close to the earth. The height of it is determined more by the height of near-by plateaus and passes than by that of the peaks. It is certain that during many of the lowland storms the mountain peaks thrust up into the sunshine through the silver lining of the clouds.

Wind is an interesting factor in the distribution of the snowfall. It sweeps snow off exposed ridges and accumulates it in vast quantities at places where a glacier starts or where the snow avalanches to a glacier. Columbia's Crest — the summit — appears to be in a large measure formed by snow that the wind carries up to it from the slopes far below. Thus, to snows that fell on these slopes the height of the peak and its white top are in a measure due.

A score of turbulent streams radiate from this mountain. Apparently its volcanic material is easily eroded. The streams are heavily laden with gravel and sedi-

ment. Though the peak is comparatively young, the cañons made by ice and water are large. Vast portions of the mountain have already been carried away by the erosive forces of ice and running water.

V

CRATER LAKE NATIONAL PARK

THE supreme attraction in Crater Lake National Park is the vivid blue lake that sleeps in the rugged and magnificent crater of a dead volcano — Mount Mazama.

One golden September afternoon I climbed alone upon the rim of the crater near Eagle Point. There was no wind, and everything lay broodingly silent in the sunshine. In an instant the scene became unreal. The lake, mysteriously blue — indigo blue — lay below. Barren, desolate mountain walls of a desert strangely surrounded it. Was I exploring the topography of the moon?

A second look at most new scenes, and there comes to me a feeling of acquaintance — of having been there before. But this scene made no advance; if it had known me, it desired to forget. I had not

seen it; it was as indifferent to my presence as though I existed not. But it was enchanting and it was eloquent. In common with all other visitors to Crater Lake, I received profound and lasting impressions.

The splendid ruin of the ashen-gray walls, the intense and refined blue of the lake, arouse the imagination. What graphic, dramatic, world-building story is locked in these bold scenes?

It is probable that this vast blue-bottomed caldron was once covered with a volcanic peak. This vanished volcano is named Mount Mazama. The geological story is that the upper half of the peak collapsed. There was volcanic violence. But it did not, like Mount Rainier and Mount Baker, explosively blow its summit to pieces. A mile or more of the upper half simply collapsed and dropped into the crater. Had an explosion hurled the enormous fragments of the top afar, they must have been found scattered about.

CRATER LAKE AND WIZARD ISLAND

But only small fragments of pumice have been discovered.

This collapse appears to have been preceded by a rupture of the base, allowing the lava to escape. This lava had filled the crater and supported its walls, and the collapse followed its removal. The upper part of this peak that apparently dropped into the crater must have been six thousand or more feet high, with a basal diameter of about six miles. Its bulk was equal to, or greater than, the whole of Mount Washington, the highest peak in New England.

An early impression that this lake crater gave me was that it had been formed by breaking off an enormous conical and hollow volcanic peak which was inverted and jammed, small end downward, into the earth. This caldron remains. It is now a jagged, gigantic central opening in the deep surrounding lava-beds. These exhibit the former fiery flooding activity of Mazama.

The volcano was active at intervals in the glacial period. This is shown in the glaciated rock-surfaces of the rim that are covered with layers of pumice and rhyolite. The lake is encircled by about twenty miles of precipitous walls that rise from five hundred to two thousand feet above the surface of the water. The lake-level is 6177 feet. The surface fluctuates a few feet each year.

The water is deep, much of it from twelve hundred to nineteen hundred feet. In a few places it is less than three hundred feet deep, with near-by surroundings several hundred feet deeper. Are these shallow spots above the tops of other volcanic cones or lava-masses?

The lava-beds in the surrounding outer slopes of the crater overlie one another at an angle that indicates that the lava was poured to them from a central point above. Extend the slopes upward from the rim on the angle of the slopes below, and the outline of the former peak is restored. This

would make a peak about the size of Mount Shasta.

At the altitude of the crater rim, about eight thousand feet, the diameter is about six miles, the same as that of Mount Shasta at the same altitude. As both peaks are composed of like kinds of lava, we may safely assume that Mount Mazama before it collapsed was about the size and height of Mount Shasta (14,380 feet).

Glacier records furnish additional evidence of the former height and magnitude of Mazama. On the rim and on the outer slopes just below it are a number of glacier grooved and planed rock-surfaces. The lines of these extend downward, so the ice must have come from above. Then, too, there are a number of moraines that show they were deposited by glaciers from upper slopes. Apparently glaciers flowed down all sides of this mountain from a central high point. Two ice-eroded cañons begin in the southern rim and extend down the slope. Plainly these were formed by ice-

streams that came down from above. Thus the angle of the lava-built slopes, and the lines of glaciation, testify to the former existence of a high central summit.

On its slopes the Fire King and the Ice King appear to have wrought and to have clashed. Both have vanished from the scene; but here remains a volcanic landscape slightly sculptured by ice. The Mazama story appears a spectacular one.

This scene is a favorite with geologists. They come to it from all over the world. Crater lakes are common. There are numbers of dead craters filled with water in South America, Asia, and elsewhere. But this is an extraordinary crater lake. The marvelous blueness is only one feature. The rare geological exhibit makes a strange appeal.

Joseph S. Diller, of the United States Geological Survey, closes his excellent monograph on the "Geological History of Crater Lake, Oregon" with the following words: —

Aside from its attractive scenic features, Crater Lake affords one of the most interesting and instructive fields for the study of volcanic geology to be found anywhere in the world. Considered in all its aspects, it ranks with the Grand Cañon of the Colorado, the Yosemite Valley, and the Falls of Niagara, but with an individuality that is superlative.

No streams flow into this lake, and there is no visible outlet. It is probable that subterranean waters empty into it and flow from it. The annual precipitation, together with the enormous quantities of snow that are blown into it, greatly exceeds the amount of water evaporated. The water is clear and cold. It is so clear that a plate may be seen upon the bottom through fifty or more feet of water. Fish may be distinctly seen swimming about at great depths.

Many alpine lakes are blue under some lights. The deep blueness of this lake may possibly be due to mineral which the water holds in solution; or also in part to its high surrounding walls and to its enor-

mous depth. Seen from the rim, a narrow margin of the water along the walls is sea-green. Yet a glassful is as clear as the clearest.

A few days spent upon the rim and in a launch upon the lake will give glimpses of world-building features and nature-history. Morning is a good time for a journey around the lake. At no point is there a beach. The steep walls descend and plunge into the water.

In the lake near the west shore is Wizard Island. It is a perfect little volcano — a crater within a crater. Although a few pines are growing upon it, the island's lava and ashes appear as if just cast from the internal furnace. It probably was formed after the collapse of Mount Mazama. Lava, cinders, and tiny water-filled crater appear strange mimicry. The island rises several hundred feet above the lake-surface, and its crater is eighty feet deep. The island is a good view-point at noon, at evening, or when the blue cold crater glows

By permission of the National Park Service, Department of the Interior

PHANTOM SHIP, CRATER LAKE

and sparkles with the reflected fires of a million fiery worlds.

Phantom Ship, near the southeast shore, is a volcanic island masted with rock-spires. It has scattered trees. From a number of points of view it has the appearance of a ship, but under certain lights it blends so completely with the walls behind it that it vanishes.

The forests are magnificent. Among the trees on the rim and on Wizard Island are noble fir, alpine fir, mountain white pine, Douglas spruce, alpine hemlock, and lodge-pole pine. Sheep-pasturing in former years wrought havoc with the wild flowers, of which there are numerous varieties. There are many kinds of wild birds and wild life. While there are other scenic attractions, the supreme one must ever be the lake of marvelous blue and its rugged, fire-tinted walls. In the ruined caldron where red fire and black smoke wildly mingled, blue water lies in repose.

On June 12, 1853, a number of prospec-

tors, led by John W. Hillman, discovered Crater Lake. Though not interested in scenery, they were aroused by this gigantic blue gem in its rough volcanic setting.

In 1885, William G. Steele began the campaign which finally won this National Park. This campaign went through numberless vicissitudes and lasted seventeen years, the Park having been established in 1902.

In 1888, Steele carried a number of trout in a can upon his back for more than forty miles. These trout were placed in the lake and grew rapidly. Since then it has been repeatedly stocked by the Government. Nowhere else that I know of can a fisherman catch a trout and clearly watch its every effort many feet under the water, as it tries to run away with or escape from the cruel hook.

This Park is in the heart of the Cascade Mountains in southern Oregon, a short distance north of the California line. It has an area of about two hundred and forty-nine

square miles. Mount Thielson, Diamond Lake, and other near-by attractive features might well be added to the territory of the Park.

VI

GLACIER NATIONAL PARK

LAKES — splendid intermountain lakes — are an unrivaled attraction in the Glacier National Park. Here, too, are other striking features — glaciers, peaks precipitous and stupendous, forests, and streams. The rugged Alplike mountains are of first magnitude. The forests that crowd the lower elevations of the park are primeval and grand. The vigorous streams are set in magnificent scenery. But I feel that the lakes are entitled to first rank among the scenic attractions in this park.

There are two hundred and fifty of these, of different sizes, each of individual outline and with an original alpine setting. Some repose in the depths of the forest. Others have a shore-line half forest and half the abrupt wall of a towering peak. Still other lakes have a wild shore of snow-fields,

glaciers, forests, meadows, and mountains. Waterfalls out of the mountain sky drop into many; cascading streams rush from the outlets of others.

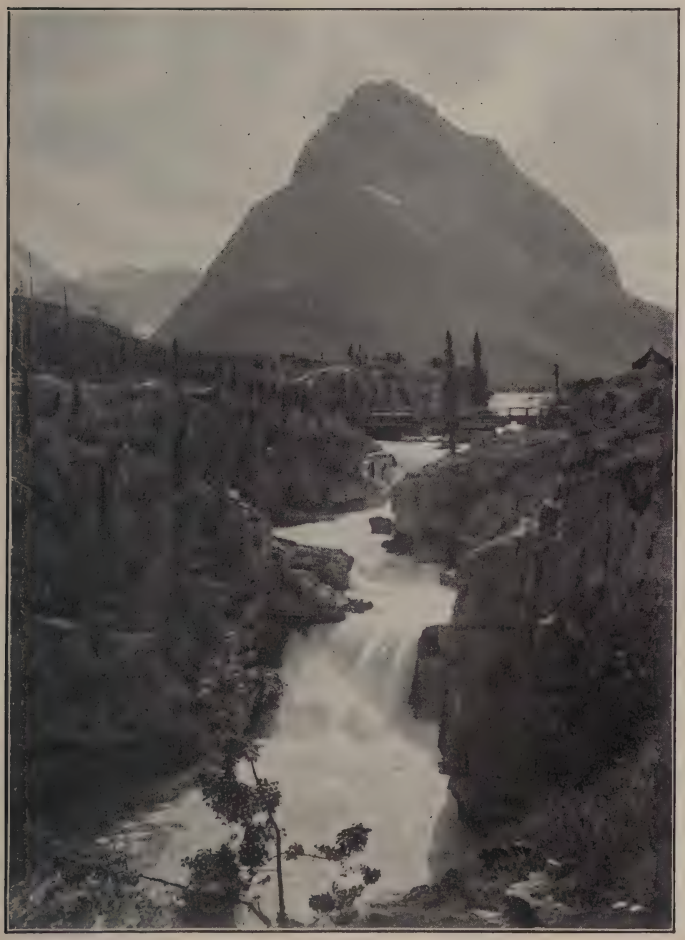
Many of the lakes are strikingly long for their narrow width. Lake McDonald is about ten miles long and one mile wide. Waterton Lake is about twelve miles long, with an average width of perhaps half a mile. Bowman Lake is about six miles long by half a mile wide. Avalanche Lake, which lies in Avalanche Basin, is hemmed in on all sides, except at the outlet, by precipitous mountains. It is a beautiful ellipse about one mile long. Iceberg Lake is on the north side of Wilbur Mountain, which towers three thousand feet above the surface of the water. The Blackfeet name for this is "Fly-around-in." McDermott and Altyn Lakes are beauty spots. The outlet of McDermott is a series of spectacular cascades. Its shore is open, and around it one moves about easily. Altyn Lake is only a quarter of a mile distant from McDermott.

These lakes lie between Grinnell Mountain and Allen Mountain and are a part of one of the grandest scenes in the Park.

Grinnell Lake lies one mile above Altyn Lake, at the foot of the tremendous cliffs of Gould Mountain. The lower end of the lake is open and parklike, while at the upper end cliffs rise about four thousand feet. This lake receives the waters from Grinnell Glacier. These pour over high cliffs at the upper end of the lake and form a beautiful spectacle. The scenes which unite around Grinnell Lake are unsurpassed in the park.

These lakes are glacier lakes. That is, the basin of each was gouged or eroded by the movement of glacial ice. There are a few exceptions where the lake is due chiefly to a morainal dam, or a dam that was formed by a landslide.

The highest peak in the Park is Cleveland Mountain, 10,438 feet above sea-level. Several others rise more than ten thousand feet, and a great number more than nine thousand feet. Many of these peaks are



McDERMOTT FALLS AND GRINNELL MOUNTAIN
GLACIER NATIONAL PARK

connected with sharp pinnacled ridges, and most of them rise steeply into the sky. Precipices, nearly vertical, that measure between two thousand and four thousand feet are common. Thus it will be seen that these two hundred and fifty lakes have a mountainous setting. Distribute these lakes on terraces among the peaks and fit in about one hundred glaciers, have the forests everywhere in the lower altitudes, cut these with clear streams, and we have the scenic make-up of the Glacier National Park. Considered as a whole, it is unexcelled mountain architecture.

The Blackfeet Glacier on the Continental Divide is the largest in the Park. Mount Jackson towers red above it. It has an area of about three square miles and lies between the altitudes of six thousand and seven thousand feet. The much-visited Sperry Glacier, which is easily reached from Lake McDonald, has a little more than one square mile of ice-area. Grinnell Glacier is about the size of the Sperry.

Altogether there are about one hundred glaciers in the Park. Most of these have an area of less than one square mile. The majority of them, of course, are mere remnants of vast glaciers. In many cases their small size is an advantage to the student. Carrying, as most of these do, the characteristics of larger glaciers, and being in a small compass and surrounded with various kinds of glacial work — moraines, lakes, and smooth rock-surfaces — they place before us, in one scene, the story of the ice age.

On every hand is evidence of glacier work. The glaciers themselves in many instances are placed in a manner that explains their mobility. You can see that they have moved and are moving. You can see the effects of their moves, and the results of the movements of the stupendous prehistoric glaciers that have vanished.

The Glacier National Park has an endless variety of small game, and in it numerous varieties of large animals are fairly

abundant. Most important of all is the grizzly bear. Black bears are common. So, too, are elk; and there is a scattering of moose, lions, deer, and antelopes. In some localities bighorn sheep and mountain goats are abundant. Trout abound in many lakes and streams.

There is a goodly array of suggestive outdoor names, many of which are of Indian application. Red Eagle Mountain, Pass, and Valley, Rising Wolf Mountain, Two Medicine Lake, Avalanche Lake, Swift Current River, are a few of the vigorous, spirited names. Many of the old picturesque and descriptive Indian names have been discarded, however, for names that are utterly unfit or meaningless.

There are scores of varieties of flowers. These brighten the woods, stand along the streams, border the lakes, and crowd close to the glaciers. They climb above the limits of tree growth. Grinnell Lake has a grand wild-flower garden on its shores. Among the many kinds are bluebell,

queen's-cup, violet, water-lily, and wild hollyhock.

The summit slopes of these mountains are above the timber-line. All the lower slopes and spaces in the Park not occupied and glorified by lakes, streams, and cliffs are crowded with forests, green and grand. Much of the old glaciation is covered with forest growths. Many moraines are crowned with spruces, and numerous glacial amphitheaters are now filled with splendid forests.

The visitor to the summit of Swift Current Pass will find himself monarch with great scenes to survey. Below, around, and above are lakes, streams, peaks, waterfalls, snow-fields, glaciers, cañons, and mountains. These are splendidly grouped and combined; gradually they fade into mysterious horizons.

St. Mary's Lake — "Good Spirit Woman Lake" — is crescent-shaped, with miles of spruce-walled shores. It has a length of ten miles in the Glacier Park and is a queen

among queens of mountain lakes. Kingly peaks stand waiting around the shores. Red Eagle Mountain, Fusillade Mountain, and Going-to-the-Sun Mountain are a part of the magnificence in which this lovely lake reposes. Mount Jackson, one of the highest summits in the Park, is often reflected in its waters.

The mountains of this Park are broken and have towering walls. On the east they rise abruptly from the peaceful plains. Nowhere in the country can be found such an array of high and nearly vertical walls. Many of these mountains and peaks are enlivened with color. Yellow, red, and green are distributed on a magnificent scale.

The very name "Two-Ocean Pass," in the Yellowstone Park, led me through the pathless forest for days in search of it. There was a fairyland novelty in the lure of the name. As soon as I heard of a glacier in the Glacier National Park whose waters were divided between the Arctic and the

Pacific Oceans, I wanted to see it. A part of the water of a glacier on Vulture Peak goes to the Pacific through Logging Creek and the Columbia River. The remainder goes to Hudson Bay through the Little Kootenai Creek. Some one has wisely proposed the name "Two-Ocean Glacier" for this ice-field.

Triple Divide Peak is another place that has a peculiarly wild, romantic appeal. This sharp-pointed peak is 8001 feet above the sea. Close together in its summit slopes, surrounded by a maze of alpine mountains, three streams start almost from a common source, each to go on its separate, scenic way to the ocean.

The Red Eagle travels towards the North Pole through the north country and empties into that vast ice-formed basin, Hudson Bay. The waters of the Cut Bank choose the channel of the Missouri in which to travel the long journey to the inland sea, the Gulf of Mexico, and perhaps from this to flow north into the Gulf Stream. The

Nyack goes to the Pacific through the crooked international channel of the scenic Columbia River.

HISTORY OF GLACIER NATIONAL PARK

George Bird Grinnell was a loyal and helpful friend to the Yellowstone National Park during its trying years. He also rendered the public the distinguished service of originating the Glacier National Park idea and helping to bring about its realization. In 1885, accompanied by James Willard Schultz, he visited a number of its now famous lakes and glaciers. On his return he published a series of articles entitled "To the Walled-in Lakes." A peak, a glacier, and a lake have been named in his honor. Year after year he returned to this region to enjoy the scenery and to study the language and customs of the Blackfeet Indian. In 1891, accompanied by Harry L. Stimpson, he discovered the Blackfoot Glacier, the largest in the Park, and a little later he wrote an

article concerning it. In an article entitled "The Crown of the Continent" he gave a good account of the region.

James Willard Schultz lived for years with the Blackfeet Indians and spent a number of years with them in this territory. He says that Hugh Monroe was the first white man to see the Glacier National Park region. This was in 1815. Grinnell states that James Doty visited it in 1853. The same year, apparently, A. W. Tinkham, a government engineer, crossed through Cut Bank Pass. The American and British boundary-line survey commissioners visited the region in 1861.

I had a few weeks in the region in the autumn of 1896. For most other National Parks I have recommended enlargements, feeling that some adjacent and important scenic territory had been left outside the Park lines. But with the vast Glacier National Park no additions appear to be needed.

Grinnell says: —

In an old notebook, under date of September 17, 1891, I found not long ago the following remark: "How would it do to start a movement to buy the St. Mary country, say thirty by thirty miles, from the Piegan Indians at a fair valuation, and turn it into a national reservation or park?"

This idea, in the course of the next ten years, grew in my mind. It was, I think, the first suggestion, in words, of the Glacier National Park. About the year 1893 indications of copper were found in the foothills. It was believed that the country contained mines, and before long strong pressure was brought to bear on Congress to purchase the land from the Indians and throw it open to settlement. The mountain region was not used by the Indians. They lived on the plains. In 1895, Secretary of the Interior Hoke Smith sent out Commissioners W. C. Pollock, George Bird Grinnell, and W. M. Clements, to treat with the Blackfeet for this territory, and a majority of the commission went into the mountains and made a hasty inspection of the region. An agreement was made with the Indians, and was ratified by Congress, and about two years later the territory was thrown open to settlement. . . .

Soon after 1902 I spoke to Senator T. H. Carter about setting aside this recently pur-

chased tract as a National Park, and found that he was disposed to favor the suggestion. I then took up the matter with friends in Montana, and induced them to write to Senator Carter about the project. The result was that a little later he introduced a bill, which passed the Senate once or twice, and at last, in 1910, passed both houses, and was signed by President Taft, May 12, 1910, and the Glacier National Park became a fact.

Certainly the most striking fact in the history of this Park is the rapidity with which it has been developed and opened to travelers. L. W. Hill has given this region a large share of his time, and in it has spent enormous sums of money. There is more than commercialism behind his work. It has been done with happy hands. He has made this a part of his life-work. He has endeavored to create on artistic lines. What he has done for this Park has stimulated interest in the other Parks and will greatly help to bring about their development.

VII

MESA VERDE NATIONAL PARK

WEIRDNESS, romance, and mystery dominate the Mesa Verde National Park. Towering high and dry above the surrounding country, carrying in places squatty, scattered growths of piñon pines and cedars, it stands silently up in the sunlight. Combined with these things, the deserted prehistoric cliff dwellings give to the Mesa a strangeness and peculiar appeal. These monuments of a departed race tell but little of the story of their builders. They are the ruins of an ancient civilization that stood its day and vanished; that —

> "Like snow upon the desert's dusty face,
> Lighting a little hour or two — is gone."

Who were the cliff dwellers? It is probable that they were Indians. No one knows where they came from, how long they remained on the Mesa, nor why they left;

how long since they went away, where they went to, nor what has become of them. Several hundred ruins of the structures they reared still remain. These are mysterious and thought-compelling, but they tell little more than is told by the Sphinx.

The Mesa Verde National Park covers seventy-seven square miles in southwest Colorado, near the corners of four States. It is in the "Land of Little Rain." The table-like summit of this steep-walled Mesa is eight thousand feet above the sea, and nearly two thousand feet above the surrounding country. Looking from the summit, one sees strange "Ship Rock" far away in New Mexico. This appears to be an enormous ship in full sail upon the sea. It adds to the unreal and mysterious air of the region.

Numerous cañons are countersunk deeply into this sunny sky plain. Many of the cañons are corniced with a heavy overhanging stratum of rock. Beneath this, in cavelike hollows in the cañon walls, the

cliff houses are found. Here ages ago the cliff dwellers lived in large communities and probably under organized government — the oldest and most fully realized civic-center scheme in America. Long before their mesa country was invaded by the men of recorded history, these people of the Southwest vanished, leaving buildings, tools, clothing, and pottery to tell of their odd and interesting Indian civilization.

When the name Indian is mentioned, the average individual usually thinks of a savage. But at the time Columbus discovered America, there were millions of civilized Indians in the Western world, living under organized government. It is true that their civilization was different from ours of to-day, and happily different from the European civilization of that time.

These early civilized Indians lived chiefly in well-built houses. Many of them traveled good roads. They possessed a keen

sense of right and wrong, and in ethics they may have averaged higher than the European. Among the tribes that were civilized were the Mayas, the Aztecs, and the Incas.

The cliff dwellers were an agricultural people, and they cultivated corn, beans, cotton, and squash. They appear to have grown crops by means of irrigation. They wove cloth of cotton and of the century-plant fibers. Probably they domesticated the turkey.

The finger-prints in their adobe mortar indicate that women built the stone walls. Among the Indian tribes of the Southwest, it was common for the men to quarry, dress, and carry the stones, while the women built them into walls. Women, too, appear to have made the pottery. The men probably were the weavers. The women ground the corn and most likely carried the water in jars from the springs. Were there more springs in the days of these people than now? Perhaps. Apparently they had numerous reservoirs.

These people did not possess a written language, and their ways of recording their thoughts or preserving their experiences were poor. They made pictographs on stone walls and placed symbols on their pottery and in their weaving. Much of their pottery is attractive in form and of ornamental pattern. There are food-bowls, water-jars, cooking-utensils, and numerous jugs and mugs.

They appreciated the beautiful. Their art, though mostly primitive, was art. It was generally symbolical. Although many of their pottery decorations were of geometric design, others represented objects of beauty in which flowing lines were required. Their basketry showed good taste. Their architecture was good. Although their buildings followed varied types, a number of them displayed lines of beauty and constructive skill.

Well-preserved mural paintings on many of the walls of their structures indicate that they had a good knowledge of dye-

stuffs as well as a primitive skill in picturing. Remains of figures of men, animals, cacti, and rain-clouds form a kind of frieze visible on three sides of the so-called painted room in one of these houses. These paintings are believed to indicate that this room was used for a ceremony akin to the New Fire ceremony of the Hopi.

Although nearly everything which they fashioned showed many elements of skill and beauty, they did not have many tools. Stone axes and hammers, scrapers, knives, and awls of bone were the common implements of use.

It may be that at one time the Mesa had a population of many thousands. It is possible that the Sun Temple was built jointly by the inhabitants of the Spruce Tree House, the Cliff Palace, and other houses of the region.

But few things which they left enable one to judge of their characteristics. They appear to have had the typical qualities of human beings. They had their super-

SPRUCE TREE HOUSE, MESA VERDE NATIONAL PARK

stitions, their weaknesses, and their strong points. But they are gone.

"I came like Water, and like Wind I go."

It is true that we know but little of the people who formerly inhabited these buildings. Surely we can learn more through study. Thus far there has been almost no systematic study, and but little careful excavation or attempt to preserve the various objects found in the ruins. A school of archæology might well be established in this Park for the purpose of securing information about the cliff dwellers and giving it to the world.

In his report on his recent excavation and repair of the Sun Temple, Dr. Jesse Walter Fewkes, of the Smithsonian Institution, says: —

The Mesa Verde is unique in its educational importance. It is destined ultimately to be a Mecca for all students of the prehistoric of the Southwest and an object lesson to all visitors who wish to see the best preserved buildings of pre-Columbian times in our country. It is self-evident that the excavation and repair of

all the ruins in this park cannot be accomplished in a few years, even were it desirable to attempt it; the work means many years of arduous devotion, intelligently directed, and a large sum of money. It is desirable to open up these precious remains of antiquity carefully, following a definite plan, availing ourselves of methods acquired by experience. The work should be done with care, and it will be an additional attraction if visitors can see how the work is done. Work on the group will reveal important architectural features, and add much to our scientific information.

Prehistoric ruins abound throughout the Southwest. Many show considerable skill in construction and also suggest that the buildings were the work of a people who had organized government.

Mrs. Gilbert McClurg, who visited the Mesa Verde ruins years ago, appears to have been the first to conceive the idea of saving these prehistoric places for the public — of preserving them in a National Park. After a campaign of a few years, led chiefly by Mrs. McClurg, supplemented by the work of organizations

and individuals, the Park was established in 1906.

In what is now this Park, a Spanish exploring party discovered cliff houses in 1541. At that time the buildings had been abandoned for generations. No one knows how many centuries or millenniums had then elapsed since the Mesa was deserted. The age of these cliff houses has been estimated from five hundred to five thousand years. Modern discovery of the region appears to have been made by a government geological party in 1874.

A few years later Baron Nordenskjöld, a Swedish explorer, spent many weeks with these ruins, and later wrote a volume concerning them. He carried away from them several carloads of pottery and other products.

The first white discoverers were either religious fanatics or people of the pot-hunter type who were looking for plunder. They were not interested in the preservation of any of the ruins discovered, nor of

any of the equipment that had no commercial value. For years some of the early settlers and adventurers made it a business to search for prehistoric buildings in order to obtain the pottery and other treasures which they sometimes contained. Often these pot-hunting treasure-seekers utterly wrecked the buildings which they found. In all probability many objects of interest or information concerning the Mesa Verde cliff dwellers have been lost.

In the autumn of 1904 I visited the ruins for the purpose of taking photographs and found a party of three pottery-hunters camped near the Balcony House. A part of their firewood that evening consisted of precious beams from this ancient house.

For many years the visitors to the Mesa Verde noticed a huge tree-grown mound on the rim of the cañon-wall, directly opposite the Cliff Palace. A few dressed stones, apparently the corner of a wall, thrust above the surface of this mound. Probably there was a building beneath it. Be-

hind and enveloping it lay a forest of low-growing and limby piñon pines and cedars. Over all was the ever-present and brooding mystery of the deserted Mesa Verde.

In July, 1915, Dr. Fewkes put a crew of men to work excavating the mound. As a result of their labors, a prehistoric stone building now stands in the sunshine. It is the shape of the capital letter D. Its straight front, which faces southward, measures one hundred and thirty-two feet; its semicircular back, two hundred and forty-five feet.

Plainly, it was built to a preconceived plan. There was no patchwork, no inharmonious combination. Precisely midway in the south wall was a recess. In another recess near the southwest corner was a fossil palm leaf. This strikingly resembles the rays of the sun, and together with a figure of the sun in the floor, suggests that the building was a Sun Temple. There is nothing to indicate that it was used or intended to be used as a dwelling-place.

The masonry is the best thus far found on the Mesa. It was laid with mortar of tough, enduring clay. The stones of the walls and partitions were small and were cut, many polished, and a few decorated. The figures on a number of these decorated stones consist of triangles, and one is the outline of a typical cliff-house doorway. The outer walls are double. None have outside openings. Perhaps the entrances to the building were either through the roof or by means of subterranean passageways from the face of the cliff just in front and beneath.

In the mound upon the ruins of this building was found a living tree that was more than three hundred and sixty years old. A long period, perhaps several hundred years, must have been required for the earthen mound to accumulate upon the ruins, and then three hundred and sixty years for the tree to grow. Apparently the Sun Temple must have been abandoned several hundred years ago, perhaps about

the year 1300. It appears never to have been occupied, and probably was in process of being completed when it was abandoned.

The so-called Cliff Palace in Cliff Cañon is centrally located in the Mesa Verde National Park. This was a stone structure more than three hundred feet long and with more than two hundred rooms. It appears to have been built in sections or installments, not to any consecutive plan. As a result, in this one building there are a number of types of architecture. In one section there is a huge square tower four stories high; in an adjoining section, a large well-built round tower. This building probably was a home for scores of people. There were mill rooms in which corn was ground, storerooms, ceremonial rooms, probably rooms used in religious worship, and other rooms called "kivas," which appear to have been used much of the time by the men as lounging-places. Fireplaces were scattered throughout the

building. Many of the walls were of cut stone, and some were plastered and adorned with paintings. Paint still shows on a number of walls.

This park contains other large stone structures and hundreds of smaller cliff ruins. Among the buildings, besides the Cliff Palace, are the Spruce Tree House, the Balcony House, the Tunnel House, and numerous buildings upon the surface. Near Mummy Lake are a number of large, tree-grown mounds, similar to the recently excavated one that covered the Sun Temple. Beneath each of these is a buried stone structure. Here, apparently, is a buried city.

VIII

ROCKY MOUNTAIN NATIONAL PARK

MAGNIFICENT mountains in the sky, peak after peak along the horizon, — an inspiring skyline, — such is the setting of the Rocky Mountain National Park. In this playground is a twenty-five-mile stretch of the most rugged section of the Continental Divide. Here are fifty peaks with summits more than two miles high. From one hundred miles distant, out on the plains of Colorado or Wyoming, these snowy, rugged mountain-tops give one a thrill as they appear to join with the clouds and form a horizon that seems to be a part of the scenery of the sky.

Splendidly grouped with these peaks and mountains are cañons, moorlands, waterfalls, glaciers, lakes, forests, meadows, and wild flowers — the Rocky Mountains are at their best.

On approaching the Park by the east entrance, through the long-famed Estes Park region, even the dullest traveler is thrilled with the first glimpse, and those who frequently behold it find the scene as welcome as a favorite old song. From the entrance, one looks down on an irregular, undulating, green mountain meadow, miles in extent. This is Estes Park. Great pines are scattered over it, singly and in groves; rocky points and cliffs rise picturesquely in the midst; and the Big Thompson River, sweeping in great folds from side to side, goes majestically across. High, forest-walled mountains surround it, and the great jagged snowy range stands splendidly above.

The Rocky Mountain Park is glorified with transcendent forms of the beautiful and the sublime. In it bees hum and beavers build; birds give melody to the forest depth, and butterflies with painted wings circle the sunny air. Mountain sheep in classic poses watch from the cliffs,

ESTES PARK AND ROCKY MOUNTAIN NATIONAL PARK

eagles soar in the blue, speckled trout sprinkle the clear streams, and the varied voice of the coyote echoes when the afterglow falls. From top to bottom the park is beautified with dainty, exquisite wild flowers of brightest hues; they crowd the streams, wave on the hills, shine in woodland vistas, and color snow-edges everywhere.

This Park has an area of about three hundred and sixty square miles. Its terraced alpine heights are about equally divided between the Atlantic and the Pacific slopes. It is twenty-five miles long, from twelve to twenty miles wide, and about one mile high from lowest to highest altitudes.

The greater part of the Park lies above the altitude of nine thousand feet. Its southeast corner is within forty miles of Denver; the northeast corner about the same distance from Cheyenne. A number of railroads run close to it, and the Lincoln Highway is about twenty miles away. The Park

is only thirty hours from Chicago, and its accessibility adds to its invitingness as a playground.

Side by side in it are two dominating peaks. These are Long's Peak, 14,255 feet high, and Mount Meeker, 14,000 feet above the sea. These great summits were a landmark for the primitive red man who saw them from the plains. For generations the plains Indians spoke of them as the "Two Guides."

Viewed as a whole from a neighboring mountain-top, either on the eastern or the western side, the Park presents an imposing appearance. My favorite near-by viewpoint is the summit of the Twin Sister Peaks.

In commenting on the appearance of the eastern slope Dr. Ferdinand V. Hayden, the celebrated geologist, wrote as follows:—

Not only has Nature amply supplied this with features of rare beauty and surroundings of admirable grandeur, but it has thus distributed them that the eye of an artist may

rest with perfect satisfaction on the complete picture represented. It may be said, perhaps, that the more minute details of the scenery are too decorative in their character, showing, as they do, the irregular picturesque groups of hills, buttes, products of erosion, and the finely moulded ridges — the effect is pleasing in the extreme.

Mountain-climbers will find a number of towering view-points. Long's Peak is the superior one, and the most dominating single feature in the Park. It is a mountain of striking individuality and peculiar ruggedness, though not extremely difficult to climb. Standing a little apart from numbers of other peaks, it is placed so as to command rugged near-by views as well as wonderful far-reaching vistas that vanish in the light and shadow of distance. Among the other peaks that climbers would do well to stand upon are Mount Meeker, Hague's Peak, and Specimen Mountain. Among the lower peaks that command magnificent scenes, I would name Meadow Mountain, at the southern end

of the Park, as one of the best. Among other excellent views are those from Flat-Top Mountain, Gem Lake, Echo Mountain, near Grand Lake, and a number of places along the summit of Trail Ridge.

The topography of the Park is one big glacial story, which in places is of unusual interest. This fascinating story left by the Ice King is for the most part well preserved and forms one of the Park's chief attractions. Nowhere in America are glacial records of such prominence more numerous, accessible, and easily read.

A few small glaciers remain — one on the eastern slope of Long's Peak, and Andrews, Sprague's, and Hallet Glaciers in the north half of the eastern slope. These glaciers are mere remnants, but none the less interesting.

Altogether there are more than one hundred lakes and tarns in the Park. Most of these are small, but each has its peculiarly attractive setting. With few exceptions, these lakes repose in basins of solid rock

LOCH VALE
ROCKY MOUNTAIN NATIONAL PARK

that were excavated for them by glacial action. In the Park are also many stupendous moraines.

Each year more than a thousand varieties of wild blossoms give color and charm to this favored spot. They are to be counted among the four chief attractions, the other three being Long's Peak, the glaciation, and the timber-line. Of the brilliantly colored wild flowers many take on large and vigorous form, while in the alpine moorlands numerous species are dwarfed and low-growing. A few bright blossoms jewel the summits of the highest peaks. Flowers grow wherever there is a bit of soil for them to live in.

On the summit of Long's Peak, nearly three miles up, in a number of places I have seen bright primroses and polemonium, blue mertensia and lavender-colored phlox. There are ragged wild gardens of alpine flowers nearly thirteen thousand feet above the sea. More than one hundred varieties of flowers brighten the ledges of the cliffs,

fringe the snow-piles, and color the moorlands of the heights above the limits of tree growth. The alpine blooms that live in dry or wind-swept places are dwarfed and flattened. They keep their beauty close to the earth. Many of these little flowering people are so greatly dwarfed that the plant with its leaf and blossom does not rise a quarter of an inch above the earth. Among these are the phlox, harebell, and the columbine.

The Mariposa lily's, perhaps, is the most classic petal in the Park. Among its conspicuous neighbors are the fringed gentian, the silver-and-blue columbine, the elaborate calypso orchid, and the graceful harebell. Among the other abundant and beautiful blossoms are violets, daisies, asters, black-eyed Susans, paint-brushes, rock-roses, pasque-flowers, which Helen Hunt called Maltese kittens, tiger lilies, golden pond-lilies, and anemones. Many of these flowers are perfectly formed and carry petals of cleanest, deepest color.

There are many kinds of wild life in the Park. Mountain sheep probably number several hundreds. Elk are increasing in number; so, too, are deer, which are already common. There are a number of black bears, possibly a few remaining grizzlies, and a few foxes, wolves, lions, and coyotes. The beaver population is numerous, and in many places are extensive beaver colonies with dams, ponds, and houses.

Among about one hundred and fifty species of birds are found a few golden eagles. These nest in the heights. The rose-finch and the ptarmigan live the year round near the snow-line above the limits of tree growth. Among the common birds most frequently seen are the robin, bluebird, blackbird, hummingbird, pine siskin, goldfinch, magpie, white-crowned sparrow, house wren, and Rocky Mountain jay.

During the flower-filled, sun-flooded days of June, while the evening shadows are

crossing the openings, the song of the hermit thrush is often heard, its beautiful silvery notes mingling strangely with the wild surroundings. In June, too, the ever-cheerful water-ouzel carols most intensely by his chosen home along the alpine streams. Likewise in this month the marvelous solitaire sings among the crags far up the slopes, close to where the forest ends and the alpine moorlands begin.

Here are primeval forests, torn by cañons and pierced by crags and rock ridges. Among the more common trees are the lodge-pole pine and the Engelmann spruce. Other species are the alpine fir, Douglas spruce, limber pine, and Western yellow pine. The aspen is found in groves, groups, and scattered growths in the moister places all over the woodland.

The timber-line in the Park is one of the most picturesque and interesting in the world. It is strangely appealing and thought-compelling. This is the forest-frontier. Its average altitude is about

eleven thousand five hundred feet above the sea. Timber-line in the Alps is only about sixty-five hundred feet. Thus it will be seen that the climate of this Rocky Mountain section is far more friendly to wood growth than that of the Alps.

The trees persistently try to climb upward, and their struggle for existence becomes deadly. The wind blows off their arms, and cuts them with flying sand. The cold dwarfs them, and for nine months in the year the snow tries to twist and crush the life out of them. Many have limbs and bark on one side only; others are completely stripped of bark. They seldom grow over eight feet high, and numbers grow along the ground like vines. In the drier places at timber-line the limber pine has sole possession, while in the moister places the Engelmann spruce predominates, and is sometimes accompanied by dwarfed aspen, birch, subalpine fir, and willow. Above the timber-line are crags, snow-piles, and alpine-flower meadows.

Traveling along the eastern slope of the Park, one encounters a number of prominent attractions.

In the south, Wild Basin, a splendidly glaciated realm of several square miles, almost completely surrounded with high peaks, contains lakes, forests, moraines, and gorges. It retains many wild glacial records of peculiar interest. North of it is the Long's Peak group, consisting of Long's Peak, Mount Meeker, Mount Lady Washington, Chasm Lake and Gorge, and Mills Moraine. This moraine is one of the most interesting in the park. Chasm Lake, at the foot of the precipitous eastern slope of Long's Peak, has the wildest setting of all the many Park lakes.

To the east of Long's Peak lies Tahosa Valley, and just beyond this rise the Twin Sister Peaks. Between Long's Peak and the Range is Glacier Gorge, a deep glaciated cañon. At the end of this, in the Continental Divide, is the Loch Vale region. Here the terraced floor is varied with tarns,

waterfalls, flowery meadows, grassy spaces, and storm-battered trees. Around it and rising above it are stupendous cliffs and precipices of glaciated rock. Above it to the west is Andrews Glacier. Eastward from it lies the Bierstadt Moraine, named after Albert Bierstadt, whose pictures gave fame to the region. A trail crosses the Continental Divide from Flat-Top Mountain, which is approximately in the center of the Park.

To the north of Flat-Top Mountain lie Fern and Odessa Lakes. They are the best-known and most popular lakes in the Park, but there are a number of others of somewhat similar character and with equally scenic surroundings. Beyond these is Sprague's Glacier; also Forest Cañon, above which extends the scene-commanding Trail Ridge. Again beyond, the Fall River automobile road crosses the Continental Divide.

In the northeast corner of the Park lies the Mummy Range, the highest peak be-

ing Hague's. On its northern slope is Hallet Glacier. A bill now (1917) before Congress provides that Deer Mountain, Gem Lake, and the Twin Sister Peaks be added to the Park.[1]

On the western slope, at the south end, is a combination of lovely and magnificent scenes. The great feature on the west side is Grand Lake, the largest lake in Colorado. It is the source of the Grand River, and furnishes a part of the water that roars through the Grand Cañon of the Colorado in Arizona. The North Inlet and the East Inlet are scenic gorges through which streams rush from the heights down into Grand Lake. The East Inlet region, between Shoshone Peak and Grand Lake, has a remarkable glacial story of its own.

In the northwest corner of the Park stands Specimen Mountain, an excellent view-point. This is probably a sleeping volcano. It is the most famous mountain-

[1] This bill passed after the above was in type. See map of the Park.

FERN LAKE
ROCKY MOUNTAIN NATIONAL PARK

sheep range in the Park. Its grassy slopes and summit contain spaces of salty ooze that attracts them. Many times I have seen a flock of one hundred or more in the crater.

IX

THE GRAND CAÑON

JOHN MUIR strongly urged that a National Park be made of the Grand Cañon of the Colorado. In commenting on this Titan of cañons, he said: —

> No matter how far you have wandered hitherto, or how many famous valleys and gorges you have seen, this one, the Grand Cañon of the Colorado, will seem as novel to you, as unearthly in the color and grandeur and quantity of its architecture, as if you had found it after death, on some other star; so incomparably lovely and grand and supreme is it above all the other cañons.

It is hoped that Congress will early create a Grand Cañon National Park. The territory most seriously considered embraces a hundred-mile stretch of the cañon with a narrow bit of each rim. This would extend about fifty miles up and an equal distance down the river from Grand Cañon

Station. It would thus include only about half the length of the Grand Cañon, and no part of any other cañon. I should like to see it extended another hundred miles up the river. It would then embrace not less than two hundred miles of the river, and would include Marble Cañon and a part of Glen Cañon. But, whatever its length, it should include a broad forest border all the way, on both rims of the cañon.

To enable the public to see this titanic gorge in the most comfortable manner and from the best points of view, it is necessary to have more public roads and trails. There is great need that this unmatched wonder have National Park protection and development. At present the main trail to the bottom of the cañon is a private toll trail!

Visitors to almost any great scene are wont to compare it with some other scene; it reminds them of this place or that place. But when one first views Crater Lake, or while one is in the presence of the Big Trees

for the first time, memory is suspended; and when one first beholds the Grand Cañon, it does not remind him of this or that—it completely possesses the observer, sweeps other scenes and places out of mind. Presently comes desire for a thousandfold capacity of feeling and comprehension. The thing is too vast and splendid for ordinary faculties.

I have boated in many of the cañons of the Colorado and have camped and tramped along their rims. Often I have looked down into them when they were filled with mists; when broken clouds hung over them; when sunshine or moonlight illumined their depths, from which I have looked forth under like conditions. But to me, whether in summer or when snow piles the rim, the Grand Cañon never loses its intense impressiveness.

The Walhalla Plateau is an extraordinary cañon view-point and is likely to become one of the most famous places on the earth. This narrow plateau thrusts ten

By permission of the National Park Service, Department of the Interior

LOOKING WEST FROM NORTH SIDE OF GRAND CAÑON

Point Sublime to right in distance. Isis Temple on left.

miles out into the vast, deep, airy Grand Cañon. It extends from the north rim, between Bright Angel Cañon and the inside bend of the main cañon opposite the Cañon of the Little Colorado. A most commanding peninsula it is, with wide and enormous depths sweeping almost entirely around it. Other commanding view-points on the north rim are Point Sublime and Bright Angel Point. Three excellent view-points on the south rim are Grand View, Hopi Point, and the El Tovar. Grand View is a few miles up the river from the El Tovar Hotel, and opposite Cape Royal of the Walhalla Plateau.

The Colorado River in Arizona flows through a series of twenty vast cañons that have a length of about one thousand miles. Most of them are end to end with only a mere break between. Of these, the Grand Cañon is the cañon of cañons. Counting downstream, it is the eighteenth of the series; counting upstream, the third. The cañon is from seven to fifteen miles wide,

and from four thousand to six thousand feet deep. It is an enormous gulf two hundred miles long, in solid rock. Less than one thousand feet across at the bottom, and eight to ten miles across at the top, it may be called a rough V-shaped gorge; or, together with its tributary cañons, it might be called an inverted hollow mountain-range. This range, if turned out upon the plateau, would measure in places more than two hundred miles in length and nearly forty miles in width, with summits rising nearly seven thousand feet; and it would be diversified with ridges, gorges, plateaus, spurs, and peaks.

The Grand Cañon of the Colorado is a masterpiece of erosion — a wonderful story carved in rock. It was excavated and washed out by the river. It is not an ordinary mountain cañon, for it lies in a comparatively level plain or plateau. During the ages, the débris-laden water sliding over its inclined bed of solid rock dug, sawed, and cut the cañon to the bottom. The river

not only carried away all the material worn from the bottom, but the thousandfold more that tumbled into it from the ever-caving walls.

Here is color in magnificent array. Most of the strata are perfectly horizontal and of great thickness, and each has an individual color. Many of the walls are brown or red, and there are strata of gray, yellow, grayish brown, and grayish green. All these are massed and arranged in vast and broken color pictures and landscapes, some of which are a mile high and several miles in length.

The top, or rim, of the cañon is in an extensive arid region. Water is extremely scarce; in a number of places not a drop is available within miles. If a boatman is wrecked in the cañon, he has little opportunity of escaping. If he should manage to climb out on the desolate, almost uninhabited plateau, he would be likely to perish for lack of water.

The cañon has a climate of its own. In

the bottom, the temperature frequently shows a range of one hundred degrees inside of twenty-four hours. Its great depth and peculiar wall exposure give it a climatic variety. The walls that face the north are much cooler than those facing the south. The temperature at the top differs from that at the bottom, and midway on the walls is a temperature distinct from either of the others. On the rim at El Tovar it may be a winter day; you descend to the river and there find a mild climate, with birds singing and flowers in bloom. The six thousand feet of descent to the river gives a climatic change that approximates a southern journey of two thousand miles. This plateau is forested and on the northern rim of the cañon the tree-growth is heavy.

Flowers bloom in the cañon every month in the year. In the niches and on the terraces are the columbine, lupine, stonecrop, kinnikinnick, dandelion, thistle, and paintbrush. Sagebrush and greasewood occur

in many places. The Douglas spruce is found upon the southern wall, the cottonwood and willow in the bottom. Beavers, a few deer, many rabbits, wildcats, and wolves are found in a few places in the bottom of the cañon, and sheep and lions upon the terraces. But the larger part of the unbroken and terraced walls is barren and lifeless.

Among the birds that gladden this gorge are the mockingbird, piñon jay, robin, quail, hummingbird, kingfisher, swallow, and owl. Here, too, you will hear that melodious and hopeful singer the cañon wren. Over this vast gulf butterflies with daintily colored wings float in lovely laziness.

In a number of the cañons, ruined cliff houses are numerous, and a few of these are found far north in Glen Cañon. The walls, in places, are marked with picture writing. This probably was the work of the cliff dwellers or of the Indians.

Much of the cañon region may well be called the "No Man's Land" of the conti-

nent. In it are a numerous and assorted lot of men with unknown histories. Mingling with these are Indians, miners, health-seekers, and strange and interesting characters, among whom are aged trappers and prospectors and real cowboys who have survived the days of adventures.

Water is the great sculptor of the face of nature. The gentle raindrop grapples with mountains of solid rock, and with never-ending persistence drags them piecemeal into the sea. Here the material is redeposited in sedimentary strata, and this may emerge into the light in the ages yet to be.

A narrow ditch in the earth will widen by the caving-in of its sides. If the ditch be deepened, the caved-in matter being removed, it will continue to widen. And so it is with this cañon; the weathering or the caving-in of these walls goes ever on. The sharpness of the walls, and many of their striking features, are due to the peculiar climatic conditions that exist in this region — the short rainy seasons and long dry

periods. Had there been a more even and abundant precipitation, it is probable that more vegetation would have been produced, which would have had a marked influence upon the walls, giving them a more rounded and less interesting form.

The cañon broadens with the years. Cut narrow by the river, it has gradually widened by the caving-in of the walls. If it had remained as the river cut it, it would now be as narrow at the top as it is in the bottom — a cañon about a mile deep, only a few hundred feet wide, and with perpendicular walls. As it is, the walls rise through a series of shattered inclines, precipitous slopes and terraces, with here and there a vertical section.

Well may the Cañon of the Colorado be called the greatest inanimate wonder in the world. Written in the exposed and remaining rock-strata through which the river has cut its way is a wonderful story of the past, a marvelous and splendid romance. At an enormously remote time the Grand Cañon

plateau rose from the primeval sea. After long exposure and great weathering it sank back, remained submerged for ages, and thousands of feet of strata were deposited upon it. Again it emerged, was exposed "a million years and a day," during which æon thousands of feet of strata were eroded away. Again it went down into the sea, and upon it were piled thousands of feet of additional strata. A fourth time it rose slowly above the water. As this plateau was rising, its surface was acted upon by the elements. The part of the plateau surrounding the Grand Cañon proper was the scene of repeated volcanic action and earthquake disturbance. Here the strata have been subjected to repeated faultings, heavings, tiltings, and lava-flows. This uplift imprisoned an enormous Eocene lake that occupied much of what is now the Colorado River basin. This lake the river drained. The drainage was quite probably caused by the fact that the eastern part of the territory was uplifted higher than the

western. The drainage-system of the Colorado River, as we now know it, began at that time to take on form and its waters started to cut the cañon. This crude outline covers cycling ages, and probably represents millions of years.

Through several thousand years the plateau slowly rose, and all this time the river was gradually cutting its way down into it. Finally the plateau ceased to rise and long remained at a standstill. After cutting down to its first base level, the river had so little fall that its waters, overladen with débris, ceased deepening the channel. The widening of the cañon went steadily on. Again the plateau slowly rose, perhaps two thousand feet. This uplift increased the fall of the river and again set it to deepening its channel, a work it is still doing.

The waters of the Colorado River are heavily laden with sediment. During the ages it has transported an inconceivable bulk of eroded material to the ocean. Much

of this has come from its three hundred thousand square miles of mountainous drainage basin and all the material which formerly occupied the vast spaces of its numerous cañons. Continual caving of the walls compels the river to spend most of its time and energy in breaking up this débris and carrying it forward to the sea. This condition has existed for thousands of years.

It should be borne in mind that the transporting capacity of running water varies as the sixth power of its velocity. Therefore when a stream doubles its velocity it is competent to move particles sixty-four times greater than before. If its rate of flow is trebled, its transporting power is increased seven hundred and twenty-nine times. This goes to explain the frightful havoc of streams at times of flood.

The tributary streams of the Colorado come from arid regions and from the deserts, and are subject to sudden violent cloud-bursts and enormous floods. Though

these are of short duration, they are of tremendous force. Earthy matter, rocky débris, and ofttimes hundreds of trees are swept along by the waters that rush in from side cañons like an awful avalanche. Lodged driftwood over one hundred feet above normal river-level tells of the magnitude of these wild floods.

Where a stream has all the load of any given degree of fineness that it is capable of carrying, the entire energy of the descending water is consumed by the transportation of the water and its burden, so that none is applied to erosion. If it has an excess of load, its velocity is thereby lessened and its power to transport is diminished; consequently a part of its load is dropped. If it has less than a full load, it is in a condition to receive more, which it eagerly does. Thereby its bed is swept clean, and then only does erosion become possible. Thus it is seen that the work of transportation may at times monopolize the entire energy of a stream to the exclu-

sion of erosion; or the two works may be carried forward at the same time.

The rapidity of erosion depends upon the hardness, size, and number of the fragments in the flowing water, upon the durability of the stream-bed, and upon the velocity of the current, the element of velocity being of double importance, since it determines not only the size but the speed of the particle with which it works. Transportation is favored by an increased water-supply as much as by increased declivity, because when a stream increases in volume the increase in its velocity outruns the increase in volume, and its transporting power is correspondingly augmented. It is due to this that a stream which is subject to floods — periodical or otherwise — has a much greater transporting power than it could possess were its total water-supply evenly distributed throughout the year.

During one period of volcanic activity the focus of lava-flows into the cañon was at Lava Falls. A number of lava-streams

burst directly into the cañon through the walls, while several flows poured their fiery floods over the brink. What a wild and spectacular condition existed while the river, deep in the cañon, received these tributaries of liquid fire! When the flow ceased, the cañon for sixty miles was filled with lava to the depth of about five hundred feet. The lava cooled, and in time was eroded away. The records of this spectacular story are still easily read.

Through these thousand miles of cañon, more than one fifth of which is the Grand Cañon, the river has a fall of about five thousand feet, unevenly divided. There are long stretches of quiet water, but in the Lodore, Cataract, Marble, and Grand Cañons are numerous and turbulent currents flowing amid masses of wild, rocky débris. There are about five hundred bad rapids and many others of lesser power. Most of these rapids are caused by rock-jams — dams formed by masses of rocky débris that have fallen from the walls above

or have been swept into the main cañon by tributary streams. A few rapids are caused by ribs of hard, resistant rock that have not been worn down to the level of the softer rock.

The cañon was discovered by Spaniards in 1540. A government expedition visited it in 1859. The report of this expedition, printed in 1861, is accompanied with a picture of an ideal cañon. It is shown as narrow, with appallingly high vertical walls. Lieutenant Ives, who was in charge, thus closes his account: —

> Ours has been the first and will doubtless be the last party of Whites to visit this profitless location. It seems intended by Nature that the Colorado River, along the greater portion of its lonely and majestic way, shall be forever unvisited and undisturbed.

Ten years later Major John W. Powell explored the series of cañons from end to end. Hundreds of expeditions that have attempted to go through them have failed. Of the half-dozen that succeeded, one was

organized and conducted by Julius F. Stone, a manufacturer of Columbus, Ohio.

"Why," I asked Mr. Stone, "did you take the hazard and endure the acute hardship of this expedition?" His reply was: —

To photograph consecutively the entire cañon system of the Green and Colorado Rivers, which, so far as the upper cañons are concerned, had not yet been done. We also wished to determine the accuracy of some statements heretofore made which seemed reasonably open to question.

Mr. Stone went all the way through the cañon, took hundreds of photographs, and made numerous measurements. He made a thorough study of this cañon, added greatly to our knowledge of it, and corrected a number of misconceptions concerning it.

But [continued Mr. Stone] it was also to get away from work! For the fun of the thing! Year after year the voice of many waters had said: "Come join us in our joyous, boisterous journey to the sea, and you shall know the ecstasy of wrestling with Nature naked-handed and in the open, as befits the measure

of a man." It takes on many forms and numberless variations, this thing called play. Its appealing voices come from far and near, in waking and in dreams; from quiet, peaceful places they allure with the assurance of longed-for rest; from the deeps of unfrequented regions they whisper of eager day- and night-time hours brimming with the fullness of heart's desire, while bugle-throated, their challenge sounds forever from every unscaled height.

I presume it is quite true that the chance of disaster (provided we consider death as being such) followed us like the eyes of the forest that note every move of the intruder but never reveal themselves. But somehow or other the snarling threat of the rapids did not creep into the little red hut where fear lives, and so burden our task with irresolution or the handicap of indecision; therefore, whatever dangers may have danced invisible attendance on our daily toil, they rarely revealed themselves in the form of accident, and never in the shape of difficulties too great to be overcome, though sometimes the margin was rather small.

Looking back now at the chance of our having been caught, a shade of hesitation flits over the abiding desire to see it all again, but the free, buoyant life of the open, unvexed by

the sedate and superfluous trifles of conventionality, the spirit of fair companionship vouchsafed by the wilderness, and the river that seemed to take us by the hand and lead us down its gorgeous aisles where grandeur, glory, and desolation are all merged into one — these still are as a voice and a vision that hold the imagination with singular enchantment.

Any one interested in the geology of the Grand Cañon will find much in the books of Powell and Dellenbaugh, but best of all are the recent reports of the Geological Survey. For glimpses of the interesting characters who frequent this region, and for a sober account of an array of Grand Cañon adventures, nothing equals the narrative in "Through the Grand Cañon from Wyoming to Mexico," by Ellsworth L. Kolb.

Professor John C. Van Dyke, author of "The Desert," has most ably summed up the Grand Cañon in three monumental sentences: "More mysterious in its depth than the Himalayas in their height. . . .

The Grand Cañon remains not the eighth but the first wonder of the world. There is nothing like it."

The land of form, the realm of music and of song — running, pouring, rushing, rhythmic waters; but preëminently a land of color: flowing red, yellow, orange, crimson and purplish, green and blue. Miles of black and white. This riot and regularity and vast distribution of color in continual change — it glows and is subdued with the shift of shadows, with the view-point of the sun.

X

LASSEN VOLCANIC NATIONAL PARK

An active volcano is the imposing exhibit in the Lassen Volcanic National Park. The fiery Lassen Peak rises in the midst of telling volcanic records that have been made and changed through many thousand years.

This Park is in northern California. It is about one hundred and fifty miles south of the Crater Lake National Park. The territory embraces the southern end of the Cascade Mountains, the northern end of the Sierra, and through it is the cross-connection between the Sierra and the Coast Range. The area is about one hundred and twenty-five square miles. The major portion of the Park lies at an altitude of between six thousand and eight thousand feet, the lowest part being about four thousand feet, while the highest point,

the summit of Lassen Peak, is 10,437 feet above the level of the sea. The Park is reached by automobile roads. It is easily accessible from the Southern Pacific Railroad in the upper Sacramento Valley, and from the Western Pacific Railroad on the Feather River.

The scientific and scenic merits of this territory were of such uncommon order that in 1907 they were reserved in the Mount Lassen and Cinder Cone National Monuments. Both these reservations are now merged into the Lassen Volcanic National Park.

Lassen Peak is one of the great volcanoes of the Pacific Coast. Most of the material in it, and that of the surrounding territory, appears to be of volcanic origin. It is in the margin of one of the largest lava-fields in the world. The lava in this vast field extends northward through western Oregon and Washington and far eastward, including southern Idaho and the Yellowstone National Park. It has

an area of about two hundred and fifty thousand square miles, over parts of which the lava is of great depth.

Lassen is the southernmost fire mountain of that numerous group of volcanoes that have so greatly changed the surface of the Northwest. Among its conspicuous volcanic companions are Crater Lake, formerly Mount Mazama, Mount Hood, Mount St. Helens, Mount Baker, and Mount Rainier. Until Lassen Peak burst forth in 1914 it had slumbered for centuries, and was commonly considered extinct. It has probably been intermittently active for ages. Many geologists think that this activity has extended through not less than two million years. Just how long it may show its red tongue and its black clouds of breath is uncertain; and just how violent and how voluminous its eruptions may become are matters of conjecture.

All about Lassen Peak are striking exhibits of vulcanism — fields of lava, quan-

tities of obsidian or natural glass, sulphur springs, hot springs, volcanic sand and volcanic bombs, and recent volcanic topography, including Snag Lake.

Two of the imposing cañons here are Los Molinos and Warner Cañon. These and other changes in the sides of Lassen Peak illustrate the old, ever-interesting, and eternal story of erosion. Both these cañons are wild places which have cut and eroded deeply into the ancient lavas of Mount Lassen. Frost and water have reshaped the work of fire. The mountain's sides show that it withstood the latest visits of the Ice King. What appear to be the distinct records of glacial erosion mark many spaces of its slopes.

The eruption of May 19, 1915, produced many changes. A volume of superheated gases burst out beneath the deeply snow-covered northeast slope. The snow was instantly changed into water and steam. The mighty downrush and onrush of water wrecked the channel of Lost

Copyright, 1914, by E. F. Loomis

LASSEN PEAK IN ERUPTION

Creek for several miles. Meadows were piled with boulders, rock fragments, and finer débris. Trees were uprooted or broken off, carried downward, and left in piles of fierce confusion.

The hot gases played havoc with the forests. A stretch from a quarter of a mile to nearly a mile wide and about ten miles long was killed by the heat of the sweeping hurricane. Thousands of trees were instantly killed and their green changed to brown. Others were charred. Forest fires were started in a number of places.

The spectacular ruins which this left behind — the trees, wreckage, slides, the changes made by ashes — may now be viewed with ease and safety. It is probable that for years to come this volcanic wreckage will be seen by thousands of visitors annually.

Fiery Lassen Peak is snow-crowned. One may ride to its summit on horseback. From the top one has magnificent views of the mountains to the north, the distant

Coast Range, and the mountains eastward by the Great Basin. On the whole, the surrounding mountain distances are hardly excelled for grandeur in the entire country.

Cinder Cone is about ten miles to the northeast of Lassen Peak. It has an altitude of only 6907 feet. It appears to have been built up chiefly during the last two hundred years and for the most part by two eruptions. One of these occurred nearly two hundred years ago. It originated Stump Lake and ejected and spread materials over considerable territory. The more recent eruption appears to have taken place less than a century ago. In the summer of 1890 I found in the crater a lodge-pole pine that was about eighty years of age.

Cinder Cone is a strikingly symmetrical small crater formed of cinders and other volcanic products. It stands in a lava-field that has an area of about three square miles. Its base measures about two thou-

sand feet in diameter, its truncated cone seven hundred and fifty feet, and it is about six hundred and fifty feet high. Its well-preserved crater is two hundred and forty feet deep and is nicely funnel-shaped.

The Indians of the region had a popular tradition of the intense activity of this cone about three centuries ago. This tradition was that for a long time the sky was black with ashes and smoke. Thousands of acres of forest were buried or smothered. The world appeared to be coming to an end. But finally the sun appeared, red as blood. The sky cleared, and volcanic activity ceased.

A number of the hot springs are agitated almost enough to be called geysers. Cold and mineral springs abound. There are a number of lively streams and plunging waterfalls.

The lake-area is twenty-three hundred acres. The largest of the lakes is Lake Bidwell. Cinder Cone stands between two lakes which appear to have been

formerly one. The eruption of this cone probably extended a lava-flow across the lake, dividing it into two parts. An outpouring of volcanic material apparently made a dam, which formed a reservoir, now occupied by Stump Lake. This filled with water and drowned a forest growth. Through the surface of this lake still thrust numerous tree-trunks of the drowned forest. The outburst of Cinder Cone that formed this lake and overwhelmed the forest probably took place nearly two hundred years ago. Other lakes are Juniper, Tilman, and Manzanita Lakes.

The greater portion of the Park is forested. Among the more common species of trees are Jeffrey pine, red fir, mountain hemlock, lodge-pole pine, white fir, and incense cedar. In places among the forests are beautiful mountain meadows.

There are scores of varieties of wild flowers. Most of these grow under favorable conditions; have warmth, moisture, and rich soil; and they show bright, clean

blossoms. The district has its full share of bird and animal life. In a number of streams fish are plentiful.

The Lassen Volcanic National Park was created chiefly through the efforts of Congressmen John E. Raker and William Kent.

The varied objects of interest in this Park, especially those associated with topography and geology, make it not only a place with curious features, but a region affording unusual opportunities for the gathering of fundamental facts concerning our resources. Here also are scenes to inspire the souls of such as can be moved by the beauty and grandeur of Nature and by the awful manifestations of her power.

Says J. S. Diller, of the United States Geological Survey, "With its comfortably active volcano, inviting cinder cones and lava fields, vigorously boiling hot springs, mud lakes and 'mush pots' for the vulcanologist to study, and the glaciated divides and cañons for the physi-

ographer, in a setting of lovely scenery and attractive camps, for the tourists all easily accessible, the Lassen Peak region affords one of the most alluring and instructive spots for a National Park."

XI

HAWAII NATIONAL PARK

A VOLCANIC exhibit unrivaled in the world is embraced in the Hawaii National Park, which was created in 1916. This Park consists of two volcanic sections in the Hawaiian Islands, with a total area of one hundred and seventeen square miles. Within this territory are two active volcanoes, Kilauea and Mauna Loa on the island of Hawaii; and one sleeping volcano, Haleakala on the island of Maui.

The celebrated and unequaled Hawaiian volcanoes are a national scenic asset, unique of their kind and famous in the world of science. Apparently, the ocean has been filled in and the entire group of Hawaiian Islands built by the lava-outpourings of volcanoes. In this National Park we may see volcanic topography in the course of construction; some

landscapes just cast in the process of cooling; others that are beginning to show the erosion of the elements; also those which vegetation is just possessing.

The Hawaii National Park has about the same latitude as the City of Mexico. There are about a dozen islands in the group, with a total area of seventy-five hundred square miles. Honolulu, the capital city, is on the island of Oahu, near the middle of the island chain, which extends from northwest to southeast. From San Francisco it is about twenty-one hundred miles to Honolulu.

Kilauea is more than two hundred miles southeast of Honolulu, and thirty miles inland from the port of Hilo. Twenty miles to the west from Kilauea is Mauna Loa. The crater of Haleakala is on a different island from Kilauea and Mauna Loa, about midway between these and Honolulu.

The active rim of Kilauea is four thousand feet above the sea. The slopes of

this volcano have an exceedingly flat grade. It is the most continuously active of the three volcanoes in this Park. It has a pit in which the molten lava rises and falls and is boiling all the time. For a century Kilauea has been almost continuously active with a lake or lakes of molten lava. The crater of Kilauea is not a steep mountain-top, but a broad, forested plateau, beneath which is a lava sink three miles in diameter, surrounded by cliffs three hundred feet high. Several times during the last century the active crater was upheaved into a hill. In a little while it collapsed into a deep pit with marvelously spectacular avalanches, fiery grottos, and clouds of steam and brown dust. Through many years the crater was overflowing. Frequently large pieces of the shore fall into the molten lake, forming islands.

The magnificent spectacle of the lake of lava at Kilauea is indescribable. Charles W. Eliot, President Emeritus of Harvard University, visited the crater and pro-

nounced it the most wonderful scene he had ever watched. It is a lake of liquid fire one thousand feet across, splashing on its banks with a noise like the waves of the sea. Great high fountains boil up through it, sending quantities of glowing spray over the shore. There are fiery, molten cascades, whirlpools, and rapids, with hissing of gases, rumbling, and blue flames playing through the crevices. It is ever changing, and the record of these changes is being kept from day to day, photographically and otherwise, by the Hawaiian Volcano Observatory.

Mauna Loa is an active crater, 13,675 feet above sea-level. It is an enormous mountain mass, covering a wide area with its very gentle slopes. This volcano erupts about once every decade. Of the three volcanoes in the Park, Mauna Loa is the most productive of new rock, which it pours out on the surface of the land. Its activities start with outbursts on the summit and culminate after a number of years

in a flow which floods the whole country for many months.

Perpetual snow crowns Mauna Loa, and ice may be found in cracks even in summer. In the winter-time there is a variety of climate from sea-level to the summit — from the warmth of the tropics to arctic blizzards on the mountain-top.

An interesting and somewhat amusing story is told in regard to an eruption of Mauna Loa in 1881. The flow of lava at that time was so heavy that it seriously threatened to wipe out the town of Hilo. When the lava ran down to within a mile of the place, the natives urged their Princess Ruth to go and conjure the goddess of the volcano, Pele, to stop the flow. She went — so the tales goes — with all her retinue, and threw into the crater some berries, a black hen, a white pig, and a bottle of gin, as sacrifices. The lava-flow stopped, and the natives believed their escape due to the odd offering, although some people have expressed the opinion

that such a collection of stuff thrown into an active volcano's crater would make the eruption more violent, if it had any effect at all.

Mauna Loa forces columns of liquid lava hundreds of feet into the air, and every few years pours forth billions of tons of lava in a few days. There is a wonderful rift-line, from which eight or ten flows poured forth during the last century. These burst out on the slopes of the mountain, not from the summit crater. After the first explosion at the summit, a period of quiet intervenes, and then the rifts open and lava flows down.

The lava cools quickly and changes through colors of red, purple, brown, and gray as it cools. Areas of each of these are seen at one time, with red-hot liquids showing in the cracks of the lava. Trees of lava are formed at one place by the flow of lava rushing through a forest and congealing around the trunks. Fields of "Pele's hair" — lava — are blown out by the wind, like

spun glass, as the fiery spray is dashed into the air on the surface of the molten lake. In the large craters are numerous smaller ones with endless lava forms, colors, and volcanic structures.

The crater of Haleakala, ten thousand feet high, is near the middle of the island of Maui. It is eight miles in diameter and three thousand feet deep. While Haleakala has not erupted for two hundred years, the entire crater is sometimes full of active fire fountains, and the fiery glow mounts to the clouds like an immense conflagration.

Professor Thomas A. Jaggar says, "The crater of Haleakala at sunrise is the grandest volcanic spectacle on earth."

No photograph can give any adequate idea of the view from its summit, often above the clouds. It is a good place from which to see the sun come up through the clouds in the crater. This event has been described as being like the birth of a new world. From here one can look down on the

island and on the sea, and see the neighboring island of Oahu.

Sidney Ballou says: "A number of people who have been to the top of Haleakala pronounce the sensation there, although somewhat indefinable and indescribable, as the chief scenic attraction of the world. Men like John Muir, who have been all over the world, go up there and say that it is the greatest spectacle in the world."

In addition to the variety of volcanic displays and lava landscapes, the Hawaiian Park contains splendid tropical groves and forests of sandalwood and magnificent Hawaiian mahogany trees with trunks over twenty feet in circumference. There are forests of tree ferns up to forty feet in height, with single leaves twenty feet long; tropical jungles with scores of varieties of the most exquisite and delicate ferns and mosses, many of them found nowhere else in the world. There are numerous song-birds of brilliant hues, many of them found nowhere but in Hawaii, and nearly

extinct except in this Park. There are rolling grassy meadows, dotted with tropical trees, shrubs, and ferns, giving a parklike effect. Many of the trees are botanical treasures, known only in this Park region, and of great rarity.

The views from the slopes and summits of the volcanic peaks are a mingling of wild magnificence and tropical splendor. The craters themselves are weird spectacles that awe visitors into silence as they watch the wonderful action of the liquid fire fountains, boiling lakes, flaming lava, and other demonstrations of the Fire King.

L. A. Thurston, of Honolulu, appears to have first proposed this Park, and he did much toward its acquisition.

XII

THREE NATIONAL MONUMENTS

I. THE OLYMPIC NATIONAL MONUMENT

THE territory embraced in the Olympic National Monument is now proposed for use as a National Park. It occupies the extreme northwest corner of the United States, a peninsula between the Pacific Ocean and Puget Sound. It is dominated by the precipitous and heavily snow-capped Olympic Mountains. These snowy summits attracted the attention of the explorer Vancouver, who named the mountains the Olympics. Their lower slopes are heavily forested with gigantic trees, and beneath these there is an undergrowth of almost bewildering luxuriance. This undergrowth is a jungle in itself. Many of the trees are heavily and picturesquely roped and bearded with moss. The openness which characterizes the Sierra or Rocky

Mountain forests is absent. Gigantic tree-trunks lie scattered over the forest floor. Many of these fell centuries ago and are water-soaked, half-rotten, and covered with moss a foot thick. Here and there a living tree, a century or more of age, is standing upon a fallen one. Others are lost in the tangle of vines, huge ferns, and vigorous wild flowers that crowd the floor of the woods. Even at midday the forest reposes in twilight.

The region is extremely difficult to penetrate and explore. The streams, even during the period of low water, are almost too swift for boats, and the tangled jungle-growth, produced by abundant moisture and a mild climate, compels the explorer to chop every foot of the way he advances. Until recent years trappers, who were supposed to go everywhere, were content to work around its outskirts. Even the adventurous prospector passed it by, and searched the earth over for gold before seeking in the heart of the Olympics.

Through the combined efforts of government agents, individuals, and organizations, the region has at last been pretty well explored. Both in exploring this Olympic region and in endeavoring to have a part of its primeval scenes saved in a park, the Mountaineers Club of Seattle has taken an aggressive part.

Up to the altitude of about four thousand feet the mountains are wrapped in dense green and heavy forest gloom. Then come the scattered grassy, flowery, snowy openings. Timber-line, kept low by the excessive snowfall, is at about fifty-five hundred feet altitude, one thousand feet lower than in the Alps, and six thousand feet below the forest frontier on the Rocky Mountains in Colorado. The summit slopes are a broken array of snow-fields, ice-piles, and glaciers. Above the timber-line, vast, deep snow-fields cover much of the area. These white summits show from far out at sea.

Mount Olympus, with an altitude of 8250 feet, is the highest peak. Among the

other commanding peaks are Meany, Cougar, and Seattle.

The climate, tempered by the warm sea, is mild. Probably no other region in the United States has a heavier rainfall and snowfall. From sixty to one hundred feet of snow is deposited over it each winter. The only comparatively rainless months are July and August. The rain, and the water from the ice- and snow-fields, supply numerous steeply inclined streams, which descend in roaring waterfalls and in long, leaping wild cascades.

This region excels in the number and crowded conditions of large tree growth, and the impenetrable luxuriance of undergrowth. Hemlock, cedar, spruce, and fir predominate. While the hemlock is the most common tree here, the cedar is the most striking. The latter is a strangely stiff and mysterious tree of rather stocky growth. In this moist, mild clime it finds conditions for development almost ideal. The two kinds of cedar are the Alaska and

the red. Thousands of acres here may be seen crowded with tall trees that will average five feet or more in diameter and one hundred and fifty feet in height. Trees twelve feet in diameter are not uncommon, and the United States Geological Survey reports one with a diameter of twenty-eight feet! Thousands of acres of red fir trees may also be found in which the average height of the trees is two hundred and forty feet!

Wild flowers are everywhere. They edge the snow-fields, cover the breaks in the cliffs, line the streams, and bank with bloom the fallen forest patriarchs. Among the common blossoms are the lovely cassiope, — white heather, — mountain anemone, phlox, and "Indian basket grass."

This is the home of the gigantic Olympic Roosevelt elk, and among the other common animals are the bear, deer, wolf, fox, lynx, otter, and beaver. The streams are simply crowded with trout. Bald eagles are found, and there is an array of flickers,

MOUNT ST. HELENS
From the Timber-Line Trail on Mount Rainier

woodpeckers, warblers, jays, sparrows, and hummingbirds. The solitudes of this sylvan park are cheered with the melody of the water-ouzel, the Alaska hermit thrush, and the winter wren.

But the mountain summits are significant as view-points. From them one commands the sea, islands, and the broken shore of the Pacific. Bright Puget Sound, with a scattering of dark islands and ragged edges, fills the foreground. Looking toward the southeast across the darkly forested mountains through which rolls the Columbia, one enjoys a view vast and imposing. The dark forest cover is pierced by three snow-laden and steaming sleeping volcanoes. The most impressive one of these is Mount Rainier, with a score of enormous glaciers covering head and shoulders. Another one is Mount Adams. But the most exquisitely beautiful of all the peaks which the summits of the Olympics command is Mount St. Helens. The head and shoulders of this mountain rise a per-

fect snowy cone above the purple forest robe and stand as perfectly poised as a Greek statue of marble.

The Olympic National Park should include about three hundred square miles. What a splendid attraction if this area of primeval scenes and forests were kept in a state of nature!

2. THE NATURAL BRIDGES AND RAINBOW BRIDGE NATIONAL MONUMENTS

Utah has the four grandest natural bridges in the world. Three of these are in the Natural Bridges National Monument, and the fourth in the Rainbow Bridge National Monument. There are natural bridges elsewhere in Utah, and in the Yellowstone and the Mesa Verde National Parks; also in Virginia and various other places. But so far as known, the four in these two National Monuments excel all others in size, in impressiveness, and in wildness of setting.

These National Monuments embrace

desert regions in southeastern Utah which are made up mostly of rock-formations. Standing out on the strange desert, the fantastic forms and weird sandstone figures exhibited give the whole region a peculiar impressiveness. There are countless statuesque forms and groups that are surprisingly faithful in their resemblance to figures of birds, animals, humans, and temples; and all are of heroic size.

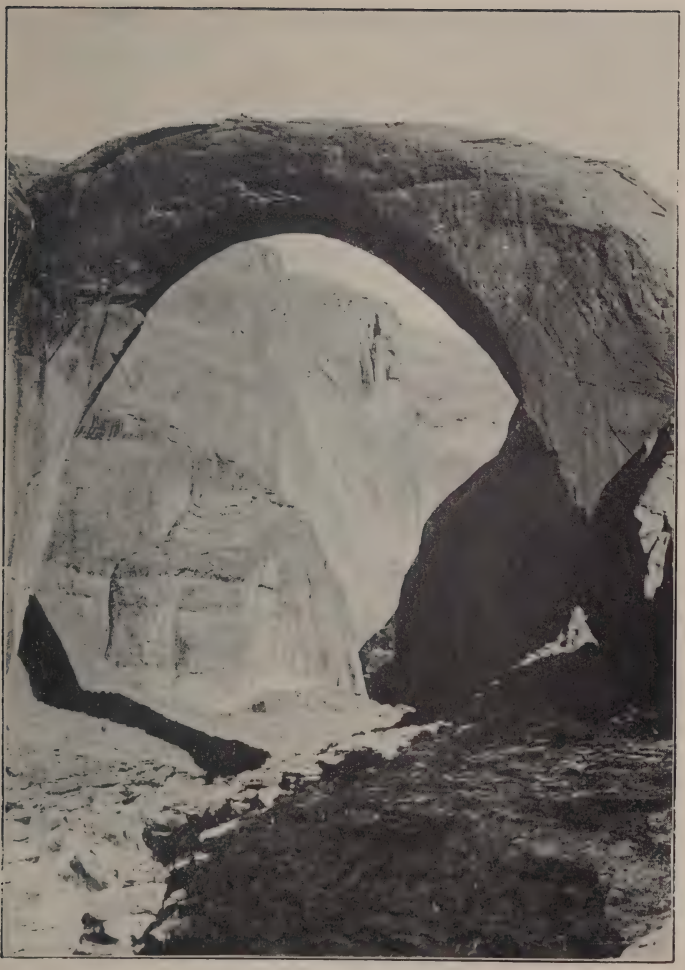
The bridges in the Natural Bridges Monument are known as the Sipapu or Augusta Bridge, the Kachima or Caroline Bridge, and the Owachomo or Little Bridge. The former of each of these names is of Indian origin and is the official one.

These three bridges are all within a small area. The Sipapu is 260 feet long on the bottom; the span is 157 feet high and 22 feet above the creek-bed. Its road-bed width is 28 feet. The Kachima Bridge has a span of 156 feet, a total height of 205 feet, and a width across the top of 49 feet. The Owachomo Bridge has a light, graceful

structure. Its span is 194 feet and its surface 108 feet above the bottom. The arching part has a thickness of only 10 feet.

The Rainbow Bridge, whose official name is Nonnezoshie, is more of a magnificent rainbow arch than a bridge. It has splendid and striking proportions. Its great graceful arch is 308 feet high and 274 feet long.

These bridges are of sandstone of reddish cast, stained in many places with blackish or greenish lichens and rust. Like any other rock-forms, they are the product of various erosive forces — illustrating the survival of the fittest. Their material, being slightly more durable than that of the now vanished rocks, or possibly less severely tested, has endured while the other material has been dissolved and worn away. In the fashioning of the surface of the earth Nature sometimes makes beautiful and imposing statuary. She has done so here. In the surrounding country are turrets, cisterns, wells, conelike and dome-



RAINBOW NATURAL BRIDGE
RAINBOW NATIONAL MONUMENT

like caves and caverns, and nearly complete arches. In fact, arches and bridges showing every degree of completion and past prime condition may be seen. Near by are numerous deserted cliff dwellings. These unusual structures leave a lasting impression on every visitor. Plans are already under way to make these wonders easily accessible to the public.

3. MUKUNTUWEAP NATIONAL MONUMENT

The Mukuntuweap National Monument, Utah, has as spectacular a cañon, and as stupendous an array of vast rock-forms, as is to be found anywhere in the world. This territory is often spoken of as "The Little Zion River Region." The Mukuntuweap Cañon has some of the forms shown in the Grand Cañon, and an array of colors not equaled in any other cañon known. In width it varies from half a mile to only a few rods across. It does not all tend in a straight direction. It curves. The cañon walls in places are sheer and

rise from two thousand to three thousand feet. One of its most startling features is shown in the overhanging walls, which the water has undercut so that in places the walls prevent a person in the bottom from seeing the sky.

In a recent report on this cañon, T. E. Hunt, of the Department of the Interior, wrote: —

> At the south end, the cañon is about twelve hundred feet wide, but gradually narrows for a distance of seven miles, until a point is reached where with outstretching arms the finger tips touch the walls on either side. In a number of places the walls of this cañon rise vertically to a height of more than two thousand feet, thus exhibiting a plain surface of extremely hard, pink sandstone.

The vast barren areas of the walls are broken by figures in relief, and statuary on the summits — all the carving of Nature. On the terraces and in the niches are growths of ash and oak, maple and spruce and other trees. In a number of places these walls are further enlivened and glori-

fied by waterfalls that plunge grandly over them into the cañon. We thus have in this region an unexcelled variety of the best-known cañon effects — the vast sweep of vertical walls, the walls that are undercut so that they appear to lean, and extreme narrowness between the walls.

But, enlivening and glorifying all these, is the color! Here you will find immense spaces of chocolate, red, crimson, magenta, and maroon, with touches of silver and gold. It is doubtful if Nature has anywhere covered such immense areas with such deep and contrasting colors as in this cañon.

This region is little known, but probably in a short time it will be easily accessible. It was made a National Monument in 1912. The people of Utah now want it for their National Park.

XIII

OTHER NATIONAL PARKS

1. WIND CAVE NATIONAL PARK

THE Wind Cave National Park consists of about sixteen square miles of pine-covered hills in the southwestern corner of South Dakota. It is about twelve miles north of the town of Hot Springs and about the same distance southeast of Custer. The altitude is between four thousand and five thousand feet. It was created in 1903. The scenery is typical of the picturesque Black Hills region, which the Indians especially loved.

The Park's special attraction is a large natural cavern. This has recesses said to have been traced for ninety-six miles, but never thoroughly explored. Its name is due to the strong air-currents noticeable at the entrance, which sometimes blow one way and sometimes another. Bridges,

stairways, landings, and paths through the cave's mysterious passageways permit visitors to reach its natural splendors, which are seen by the light of burning candles or magnesium ribbon.

The cave was discovered in 1881. Its temperature varies only between forty and forty-seven degrees the year round. Some of its known passages are almost five hundred feet below the surface of the earth, and wind over, under, and around one another. The formations are mostly of limestone. Among the features of this interesting underground world are a spring and a miniature lake, beautiful calcite crystals, exposed geodes, boxwork forms, and other attractive natural formations.

The Park is the permanent home of a herd of buffaloes, presented to the Government by the American Bison Society. Herds of elk and antelope are also found in an inclosed section. Many white-tailed deer running wild in the region annually seek shelter within the Park from the at-

tacks of hunters. Grouse and quail are increasing in numbers under National-Park protection.

2. SULLY'S HILL NATIONAL PARK

Sully's Hill National Park was established in 1904. Its area is only seven hundred and eighty acres. It is on the south shore of Devil's Lake, in northeastern North Dakota, near Fort Totten.

Lack of an appropriation for the care and protection of the Park makes it necessary (1917) for the Superintendent of the Government Industrial School for Indians, which is about one mile east of Fort Totten, to act as Superintendent of the Park. It is badly in need of conveniences — as roads, trails, clearings, etc. Although money has been appropriated for the establishment and maintenance of a game preserve on the tract, not a cent has ever been set aside for development and improvement.

It is well wooded and has many rugged

hills, including Sully's Hill. Another of its natural beauties is Sweet Water Lake. The Park is popular as a picnic-ground and Devil's Lake affords a good bathing-beach and fine opportunities for yachting. It is one of the beauty-spots of North Dakota, and its scenery is of the restful and delightful character.

3. CASA GRANDE RUIN RESERVATION

The most important prehistoric Indian ruin of its type in the Southwest is now protected and preserved, for the study and enjoyment of the people, in the Casa Grande Ruin Reservation. This contains four hundred and eighty acres, set aside in 1892. It is near Florence, Arizona, about eighteen miles northeast of Casa Grande railroad station. The ruins are of undetermined antiquity. A Jesuit missionary discovered them in 1694. As excavated so far, a great house built of puddled mud moulded into walls and dried in the sun is the main structure of the group.

As it is of perishable character, the walls have been gradually disintegrating, and a corrugated iron roof has been put over the ruins to protect them from the elements so far as possible. Considerable more repair and protection work is needed.

The main building was originally five or six stories in height and covered a space fifty-nine by forty-three feet. Surrounding Casa Grande proper is a rectangular walled inclosure. A number of buildings or clusters of rooms have been excavated in this, and others as yet unexcavated are known to be there. One hundred rooms with plazas and surrounding walls now open on the ground floor of the reservation. These ruins are of great historic and scientific interest, and have strong claims for archæological study, repair, and preservation.

4. HOT SPRINGS RESERVATION

Although the Yellowstone was our first scenic National Park, the honor of being the oldest national recreation place falls

to the Hot Springs Reservation, in the mountains of central Arkansas. It was created in 1832. Forty-six springs of hot water possessing radioactive properties, and also some cold-water springs of curative value, are embraced within the tract of nine hundred and twelve acres, fifty miles west by south from the city of Little Rock. The waters flow from the sides of Hot Springs Mountain. Rheumatism and other bodily ills are relieved or remedied by the waters. Eleven bathhouses on the reservation, and a dozen more within the little city of Hot Springs, are under government regulation.

As early as 1804 the power of the waters was known to white men, and a settlement had already begun there at that time. Tradition says that the Indians knew of the springs long before the Spanish invasion, and that they warred among themselves for their possession. Finally a truce was made, and thereafter all the tribes availed themselves of the healing waters.

5. PLATT NATIONAL PARK

The Platt National Park contains many sulphur and other springs possessing medicinal value. It includes one and a third square miles in southern Oklahoma, and was created in 1906.

6. MOUNT McKINLEY NATIONAL PARK

The Mount McKinley National Park, Alaska, was established early in 1917. It is in the approximate center of Alaska and embraces twenty-two hundred square miles. Mount McKinley is known to many Indians as "The Great One." Its summit is 20,300 feet above sea-level. On the north this stupendous mountain is exceedingly precipitous and rises 18,000 feet in a distance of thirteen miles. It is doubtful if there is a peak in the world that rises so high above the limits of tree growth. And no mountain that I know of has slopes so completely snow-covered. Its snow-line is at the altitude of 7000 feet, and from this altitude

upward only a few crags and rocky ridges show. The upper 14,000 feet of steep slopes appears a vast towering white mass of glaciers and snow. The largest glacier is the Muldrow. It is thirty-nine miles long. The summit of this peak and a part of its slopes are embraced in the Mount McKinley National Park.

This Park is a wild-life refuge. Its slopes are the greatest known big-game range on the continent. Here are mountain sheep and caribou by the thousand. Moose are common. Beaver are plentiful. And there are grizzly, brown, and black bear. Many kinds of birds use the region for their summer nesting-land. Brilliant wild flowers abound. Spruce, birch, cottonwood, and willow are the more common trees, but none of them grow large.

In 1902, D. L. Raeburn, of the Geological Survey, explored this territory and brought out much valuable information concerning it. Mr. Raeburn determined most of the boundary-line of the present

Park. In 1903, James Wickersham attempted to scale the peak. It was first conquered in March, 1913. The creation of this Park was brought about chiefly through the efforts of Charles Sheldon. When completed, the Alaskan railroad will be within fifteen miles of the Park boundary-line.

XIV

CANADIAN NATIONAL PARKS

THE Dominion, or National, Parks of Canada possess a wealth of snow-capped peaks and majestic mountains, magnificent glaciers, luxuriant forests, and peaceful, sunny valleys. These Parks are gemmed with crystalline lakes and glorified by hundreds of gardens of rare and brilliant wild flowers; they rival and surpass the celebrated scenes of Europe. Travelers who are visiting the scenic world will find in the Canadian parks a number of places of the most inspiring character and of original composition. Mental pictures of the earth's great scenes are incomplete without the masterpieces of Canada.

The Canadian people are to be congratulated on their splendid scenic inheritance. I thank them for the statesmanlike appreciation of this noble resource. They real-

ize that scenery is a rich asset, and — what is more important — that every one needs outdoor life and great views. The Canadians already have comprehensive plans for fuller use of scenery. These include not only the saving of other scenic places and getting these ready for visitors, but also plans that will assist large numbers of their own people to visit the Parks.

I. JASPER PARK

Jasper Park, the continent's largest national playground, was created in 1907. It contains forty-four hundred square miles and comprises all the ranges east of the Divide in northern Alberta. It is reached by two transcontinental railroads.

This part of the Great North country suggests adventure, romance, and history, and brings back to mind the power, the strangeness, and the picturesqueness of the earlier days of the Hudson's Bay Company. The storied Athabasca flows through it, a band of silver in a flower-strewn valley

ILLECILLEWAET VALLEY
Mount Sir Donald in distance. Glacier Park, Canada

of meadow and park land, hemmed in by glistening mountains. An important fur district a century ago, its trading-posts now are tourist resorts with railroads and hotels.

Yellowhead Pass, of historic associations, is the western entrance. Two grim peaks guard the eastern portal. Roche Miette, which dominates the surrounding country, was formerly a favorite Indian hunting-ground for mountain sheep. Perdrix or Folding Mountain has strange folds and angles in its strata.

Many roads and trails reach the beauty spots of this park. Fiddle Creek Cañon is in places only twenty feet wide, but the roaring, rushing waters are two hundred feet below. On the same road are the celebrated Miette Springs and Punch-Bowl Falls, a geological curiosity. Maligne Lake is a scenic jewel, and its river cañon displays wonderful erosion. The Park abounds in minerals. Administration headquarters are at Jasper.

2. ROCKY MOUNTAINS PARK

Indian stories of remarkable and curative hot springs probably led to the creation of the Rocky Mountains Park, the oldest and best-developed of the Dominion's national playgrounds. With statesmanlike foresight, the Government determined to retain the springs region in a National Park as a permanent health and pleasure ground for all the people. In 1889, two hundred and sixty square miles were thus set aside, and the Park has since been enlarged to eighteen hundred square miles. It lies on the east slope of the Rockies in Alberta, adjoining Yoho Park.

The springs rise in Sulphur Mountain, near Banff, the geographic and chief tourist center. On this mountain-side the Government conducts public baths. The region is a winter as well as a summer resort.

The Banff district also possesses notable scenery. It has an invigorating at-

mosphere and the peaceful serenity of a lovely mountain valley, with bare, rocky summits and dark, forest slopes. This was a celebrated Indian hunting-ground, and the legends and traditions of the aborigines will ever touch it with the spell of adventure and romance. Here is beautiful Lake Minnewanka. Beyond lies the strange valley of the Ghost River. It is a limestone cañon, into which a number of streams fall, but from which none are known to flow. An undiscovered subterranean outlet is supposed to account for this phenomenon.

Banff has an excellent Government museum, containing complete collections of the mountain flora and fauna, also a zoo, buffalo-corral, and moose-pasture. The town-site is owned and controlled by the Government, which makes regulations, leases ground, and issues permits for competitive business.

Laggan, another railway station in the Park, is the center for the celebrated Lake

Louise district. Near are snow-capped peaks standing thickly together, with countless tumbling streams and leaping waterfalls.

High among the mountains are exquisite blue or emerald lakes, set like sparkling gems in the bold surroundings of peaks and glaciers. Chief of these is the famous Lake Louise.

Brilliant wild flowers in luxuriant profusion and of many varieties are one of the Park's chief charms. Delicate twinflowers, adder's-tongue, false heather, and dainty blossoms of every hue are included in these wild alpine meadow displays.

A transmountain automobile road from Calgary runs through the Rocky Mountains Park and into the Yoho Park. Its route includes points of great scenic interest. This road will be extended to the Pacific.

3. YOHO PARK

Scenic allurements are numerous in Yoho Park, which embraces five hundred and sixty square miles of the west slope of

the picturesque Rocky Mountains, in eastern British Columbia. Fantastic shapes and sharp points characterize it. The vegetation is rich and verdant. Many wonderful views and interesting districts in it are easily reached.

Yoho Valley in this Park was not discovered until 1897, but its unusual beauty at once attracted numerous visitors. Takakkaw Fall is the thunderous spray-shrouded leap of eleven hundred feet of a glacier torrent. The Indian name means "It is Wonderful." This valley also possesses other beautiful falls, a remarkable ice region, and other interesting alpine features.

Emerald Lake, admired by artists and nature-lovers, is said to have twenty shades of green, but never one of blue, in its crystalline mirror depths. It is reached by a straight road through dark fragrant firs that meet overhead. A dazzling white mountain at the end of the vista gave rise to the name Snowpeak Avenue.

The Natural Bridge is not far from

Field, the main-line railway town that serves as a center for this national playground. The Kickinghorse River forces its way through a narrow gap in a solid wall of rock. Rocks remaining above this boiling, seething mass of water and cloud spray make a natural passageway across and give the formation its name.

Millions of trilobites have been found in the extensive fossil-bed of Mount Stephen. This probably was once the bed of an ocean. This massive, round-topped mountain, 10,523 feet high and with curiously marked sides, is probably the most frequently climbed peak in Canada. It seems to rise directly over the town, is not difficult to ascend, and affords wonderful views of the "frozen sea" of snow peaks to the north and west.

4. WATERTON LAKES PARK

Waterton Lakes Park, in southern Alberta, is notable chiefly for its glacier lakes. Although one of the smallest, it is one of

the most beautiful of the Canadian scenic reservations. Since sixteen square miles were set aside in 1895, it has been enlarged to four hundred and twenty-three square miles.

For about twenty miles this Dominion playground adjoins the Glacier National Park of the United States. The two will be linked by a motor road, so that visitors to one may also enjoy the other. An enlargement of the Waterton River forms the main chain of lakes. The upper one, nine and a half miles long, extends three miles into the United States.

Prehistoric glaciers gouged out the main valleys, leaving them carved in massive proportions. Beautiful streams rush down cañons, plunge in shining cascades, or remain dammed up as superb lakes. The lower valleys are clothed with forests. Columnar peaks, fantastic rock formations, and unscalable precipices complete the imposing effects.

Fishing is a leading attraction. The

Park contains many Rocky Mountain goats and bighorn sheep. Grizzly and black bears and mountain lions also are frequently found.

5. REVELSTOKE PARK

Revelstoke Park is a natural park on Mount Revelstoke's summit, near the city of Revelstoke in British Columbia. This mountain's rolling uplands are studded with beautiful groves, dainty flowers, and exquisite lakes. The wonderful views include unnamed and unclimbed peaks, wild forests, streams and falls, and a great icefield. A motor road to reach this summit panorama is being completed. The Park has an area of ninety-five square miles. It is well adapted to ski-jumping and kindred sports.

6. THE ANIMAL PARKS

To protect its large wild animals and prevent their threatened extinction, the Canadian Government has gone to enor-

mous expense and trouble. Two animal parks have been established: Elk Island Park of sixteen square miles, near Lamont, Alberta; and Buffalo Park of one hundred and sixty square miles, near Wainwright, Alberta. The former contains many elk and deer, as well as moose, buffaloes, birds, wild-fowl, and water-folk. Buffalo Park makes a natural home for over two thousand wild bisons, the largest pure-blooded herd in the world. The original seven hundred of these were bought from a Montana Indian. Both parks produce their own forage, and are well fenced and fire-guarded. They have many scenic lakes, woods, hills, and valleys. Visitors are admitted to study the wild life under natural conditions.

7. ST. LAWRENCE ISLANDS PARK

As a National Park for summer use by fishermen, campers, picnickers, and excursionists, the Dominion Government has a dozen islands among the Thousand Islands

of the St. Lawrence River. Eleven of these were purchased from Indians and the twelfth was donated for park purposes. (Other islands in the vicinity are part of the New York State park system.)

8. FORT HOWE PARK

Fort Howe National Park is the first of a new kind of Canadian parks that will preserve historic places. An old British fort site at St. John, New Brunswick, comprises the first of these historic parks. It covers nineteen acres. Here a resort will be established, and memorials of important events connected with the spot will be erected.

Responsibility for the creation and the administration of Canadian National Parks rests upon the Minister of the Interior. Under his direction is a Commissioner of Dominion Parks, with a staff. This is absolutely separate from the Canadian Forest Service. This bureau is charged

with responsibility for the administration of all park matters, under one head. The head office plans the work and the several superintendents carry it out under the inspection of the chief superintendent. Park appropriations are voted each year by Parliament in one lump sum, on estimates prepared by the Parks Bureau. Each superintendent is furnished every month with an amount sufficient to cover the cost of the work planned for the month ensuing. This system means uniformity of administration; expenditure based on a proper perspective of the needs of the several Parks; a comprehensive scheme of development; and flexibility to meet changed conditions.

Further information concerning these Parks may be had from the Commissioner of Dominion Parks, Ottawa, Canada.

XV

PARK-DEVELOPMENT AND NEW PARKS

A PLATFORM for park-promoters: —

1. Immediate appropriations for every National Park.
2. Early enlargement of a few of the Parks.
3. Prompt creation of a number of new Parks.
4. The National Park Service needs the help of your eternal vigilance and sympathy. Keep the National Park Service absolutely separate from the Forest Service or any other organization.
5. Concessions are a bad feature in any Park. The Palisades Inter-State Park is run without concessions. Why should private concerns reap profits by exploiting the visitors to National Parks?
6. A Board of National Park Commissioners is needed. These commissioners should act as a Board of Directors, as do the Inter-State Park Commissioners, and have absolute control over the National Parks.

No nation has ever fallen through having too many parks. We may have too

many soldiers, too many indoor functions, too many exclusive social sets, but the United States Government, or any other, will never fall for having too many national parks.

Nearly all the large nations of the earth now have national parks or are planning to create them. Canada, Australia, and New Zealand are especially thoughtful in park matters. Switzerland has a number, and is planning new ones. A number of South American countries are making investigations with the view of establishing national parks.

National parks are an institution intimately allied with the general welfare. You need this institution, and it needs your help. Every one ought to be glad to help better and beautify our land. Whittier was once asked by a young man for advice as to how best to succeed. The poet told him to attach himself to a noble and neglected cause and to stay with it till he won. The Park field greatly needs

the help of young men and young women who are willing to serve a noble cause. In connection with National Parks you can be exceedingly helpful in furthering the following work: —

A number of new Parks should be at once created. A number of the old Parks need to be enlarged. Appropriations are greatly needed for the development of all. You can help the National Park Service. It is in danger of being crippled by the lack of appropriations. A number of the National Monuments should at once be made National Parks. Among these are the Grand Cañon, the Olympic, the Mukuntuweap Cañon, and others. The Sequoia and other National Parks need enlargement; and the Mount St. Elias and other scenic regions, especially the Mount McKinley region, are most worthy of early consideration for park purposes.

The Yellowstone Park needs to have the Grand Teton region added; Rainier, about twenty square miles at the south-

TETON MOUNTAIN REGION, PROPOSED ADDITION TO YELLOWSTONE PARK

west corner; Crater Lake, a few square miles on the west and north; Yosemite, mountainous country on the east and southeast; Rocky Mountain, small areas — east, west, north, and south; and the Sequoia, Mount Whitney and the King's-Kern region.

One of the most deserving of National Park projects, as well as one of the most unique, is that which centers about the Jamez Plateau, in New Mexico. Upon this plateau in prehistoric times stood a metropolis of Indian civilization, and the magnificent ruins which remain make this place priceless, and throw over it one of the most fascinating mysteries in the realm of archæology. A number of the buildings were stone structures of excellent and artistic architecture, and contained hundreds of rooms. The pottery and other records left by this vanished people indicate that they were a people of culture and refinement.

While the opposition is delaying the

making of this Park, the despoilment of the region goes on. In this connection Dr. Jesse W. Fewkes makes this significant statement: —

> Too strong language cannot be used in deprecation of the butchering of the architectural features of our Southwestern ruins by pothunters, either private individuals for gain or representatives of institutions under the name of scientific research.

The Cook Forest in western Pennsylvania, the greatest existing primeval growth of white pine; a splendid redwood forest near Eureka, California; the Dunes on the shore of Lake Michigan in northern Indiana; the Mammoth Cave of Kentucky; the Luray Caverns in Virginia; and a stretch of the seashore in eastern North Carolina, — all ought to be public property, though now privately owned. These places might be saved for the people for all time in State Parks, but their unique and splendid characteristics justify their becoming National Parks.

Nearly all proposed National Park areas are of territory in the public domain — still owned by the Government. The privately owned areas that are proposed for National Parks are places admirably fitted for park purposes, and are located close to millions of people.

It is important that the remaining scenic areas in the country be at once made into State or National Parks. Fortunately there still are a number of these wild places, but it will require effort to save them. Each Park proposed will have powerful and insidious opposition. The insidious opposition to National Parks will say, "There is a feeling in Congress that we should not have any more National Parks at this time"; or, "We should wait until present ones are improved."

Scenery is perishable — is easily ruined. The better parts of scenery are birds, flowers, and trees. These are easily despoiled. No work, no public service, is more noble than that of the Park exten-

sion and improvement which now presses us. Every National Park needs appropriations. It is the duty of every one to ask and urge Congress at once to make adequate appropriations.

Much is to be gained and nothing to be lost in acting promptly. It is important that new Parks be created now, a working plan made for all, and the development pushed. When all our National Parks are ready for travelers, we shall not need to shout, "See America First."

The phrase "See America First" may have done a little good, but it is now obsolete. A plain condition now confronts us. Scenic America is to be made ready to be seen. Only a small percentage of the area of our National Parks is really ready for the traveler.

Congress should not be blamed for this condition; neither should we severely blame ourselves. But we ought promptly to see that these Parks receive adequate appropriations. If we do this, in a short time

Copyright, 1900, by W. H. Wilcox, Port Townsend, Wash.

MOUNT BAKER FROM THE WEST

Mount Baker is likely to be a National Park

the National Park Service, through its Director, will say, "Your National Parks — our matchless wonderlands — are now entirely ready for millions of travelers."

The plan for the development of National Parks includes three types of hotels, the luxurious, the popular-priced, and inns or shelter cabins that are clean and comfortable, and that give simple entertainment at the lowest possible cost. And all buildings should be of an architecture that harmonizes with the landscape.

Guides in Parks should be of the highest type of culture and refinement, naturalists who can impart information. Of course they must be masters of woodcraft. The wilderness is destined to have a large and helpful place in the lives of the people. This is to be partly brought about by guides and Park rangers. There should be guides of both sexes.

The ultimate development should embrace a scenic road-system, roads built so as to command scenery and to be for the

most part on mountain-sides and summits. They should touch the greatest and most beautiful spots, and should follow, not the lines of least resistance, but those of greatest attraction. In places along the forested roads, openings might be cleared so as to expose near scenes and to enable travelers to see the game which may come to these openings.

Many roads should be paralleled by trails for people afoot or on horseback. Of course trails should be made to numerous high or wild places not reached by roads.

Many persons do not realize the difference between a forest reserve and a National Park. A forest reserve is primarily used for cattle-grazing and sawmills, while a National Park is a region wholly educational and recreational for your children and yourselves. A forest reserve is a commercial proposition, while a National Park must be estimated by higher values. In a paper on the conservation of

scenery, in "The Rocky Mountain Wonderland," I have said: —

We need the forest reserve, and we need the National Park. Each of these serves in a distinct way, and it is of utmost importance that each be in charge of its specialist. The forester is always the lumberman, the park man is a practical poet. . . . The forester must cut trees before they are over-ripe or his crop will waste, while the park man wants the groves to become aged and picturesque. The forester pastures cattle in his meadows, while the park man has only people and romping children among his wild flowers. The park needs the charm of primeval nature, and should be free from ugliness, artificiality, and commercialism. For the perpetuation of scenery, a landscape artist is absolutely necessary. It would be folly to put a park man in charge of a forest reserve, a lumbering proposition. On the other hand, what a blunder to put a tree-cutting forester in charge of a park! We need both these men; each is important in his place; but it would be a double misfortune to put one in charge of the work of the other.

In this connection Stewart Edward White recently wrote: —

If the public in general understood the difference between a National Park and a Na-

tional Forest, there could be no doubt as to the opinion of any intelligent citizen. The distinction is so simple that it seems that it should be easy to get it within the comprehension of anybody. A National Park is an open-air museum set apart by Congress either to preserve from commercial development beautiful scenery, trees, natural monuments, or some of the forests that are being cut commercially both in private and national forests. The idea is not commercial development along even conservative and constructive lines, but absolute preservation in a state of nature. Once this distinction is grasped, no one can doubt that these two institutions demand entirely different management. It would be as sensible to put men with the same training in charge of both National Park and National Forest, as it would be to place the same men with the same training in charge of a busy shoe factory and a museum of archæology.

Says Frederick Law Olmsted: —

Why should there be a distinction between National Forests and National Parks? If the public is at liberty to use both as recreation grounds, why should they not all be under one management, in the interest of a more economical administration?

The National *Forests* are set apart for eco-

MOUNT ST. ELIAS FROM EAST SIDE OF AGASSIZ GLACIER, ALASKA

nomic ends, and their use for recreation is a by-product properly to be secured only in so far as it does not interfere with the economic efficiency of the forest management. The National *Parks* are set apart primarily in order to preserve to the people for all time the opportunity of a peculiar kind of enjoyment and recreation, not measurable in economic terms and to be obtained only from the remarkable scenery which they contain — scenery of these primeval types which are in most parts of the world rapidly vanishing for all eternity before the increased thoroughness of the economic use of land. In the National Parks direct economic returns, if any, are properly the by-products; and even rapidity and efficiency in making them accessible to the people, although of great importance, are wholly secondary to the one dominant purpose of preserving essential esthetic qualities of their scenery unimpaired as a heritage to the infinite numbers of the generations to come.

Because of the very fact that in the Parks, as well as in the Forest, considerations of economics and of direct human enjoyment must both be carefully weighed in reaching decisions, and because the physical problems are much the same in both, the fundamental difference in the points of view which should

control the management of the National Parks and that of the National Forests can be safely maintained only by keeping them under separate administration.

John Nolen says: —

The minor purposes of forests may correspond somewhat with the major purposes of parks, and *vice versa;* but the main and essential purposes of each are altogether different from the main and essential purposes of the other and any confusion of them is sure to lead to waste and disappointment.

Scenery is our most valuable and our noblest resource.

It is of utmost importance that each of these reservations be managed separately. Those who have distinguished themselves by appreciating the importance of National Parks and by helping them in every way, have been clear and emphatic in urging that National Park management be utterly separate from the management of National Forests. Among those who have taken this stand are John Muir, J. Horace McFarland, John Nolen, Mrs.

John D. Sherman, and in fact every one that I know of who is an authority on parks. The National Academy of Science also made a similar recommendation in 1897.

A Park should stand alone, and stand high. If we think of the Parks separately, keep them free from the dominion of commercialism, of interests, and of organizations, we may hope in a short time to receive the best use of them.

The courts have recently made a number of excellent decisions concerning the conservation of scenery, and have gone definitely on record recognizing its higher values. In a decision concerning a waterfall, Judge Robert E. Lewis said in part: —

> It is a beneficial use to the weary that they, ailing and feeble, can have the wild beauties of Nature placed at their convenient disposal. Is a piece of canvas valuable only for a tent-fly, but worthless as a painting? Is a block of stone beneficially used when put into the walls of a dam, and not beneficially used when carved into a piece of statuary? Is the test

dollars, or has beauty of scenery, rest, recreation, health and enjoyment something to do with it? Is there no beneficial use except that which is purely commercial?

This decision is epoch-marking. It emphasizes the importance to the Parks of having a management that is in no way tied up with any other work.

From the time of the creation of the Yellowstone Park till 1914 there was no official head to the National Parks, but that year Secretary of the Interior Franklin K. Lane used his right and appointed the first Superintendent, Mark Daniels.

The year 1915 was memorable in National Park history. In that year Secretary Lane appointed Stephen T. Mather Assistant to the Secretary of the Interior, with authority to do all that he could for Parks. Mr. Mather, a business man, sympathetic, well acquainted with the Parks, saw their extraordinary possibilities. Having the administrative charge of these National Parks, he at once set to work

upon the extremely difficult task of bringing them out of chaos into order. In the short time that he has had charge of them, he has made a remarkable advance in securing for them a working plan of development, and a simplified and businesslike management.

In 1915 Superintendent Daniels was superseded by Robert B. Marshall, former Chief Geographer of the United States Geological Survey. Mr. Marshall worked enthusiastically but resigned in December, 1916. Mr. Mather became Director of the National Park Service in March, 1917.

Automobiles were first admitted to all National Parks in 1915, and that year, too, a number of educative publications concerning them were issued.

In September, 1911, what may be called the first National Park Conference was held in the Yellowstone Park. This was called by Secretary of the Interior Walter L. Fisher. In his opening remarks at this

conference Mr. Fisher said that the purpose of the conference was to "discuss the matter of the present condition of the National Parks and what can best be done to promote the welfare of the Parks and make them better for the purpose for which they were created." This brought together a large gathering of men of affairs and distinctly furthered the creation of the National Park Service.

The National Park Service is one of the subdivisions of the Department of the Interior. The Service was created by an act of Congress in 1916, after a campaign that lasted for seven years. At its head is a Director. It gives the Parks an official standing and the care and development and administration needed.

All National Parks and twenty-one of the National Monuments are in charge of the National Park Service. As Monuments are scenic and educational reservations, it is plain that all these Monuments might well be in charge of the National

Park Service. Then, too, the name "Monument" might well be changed to "Park."

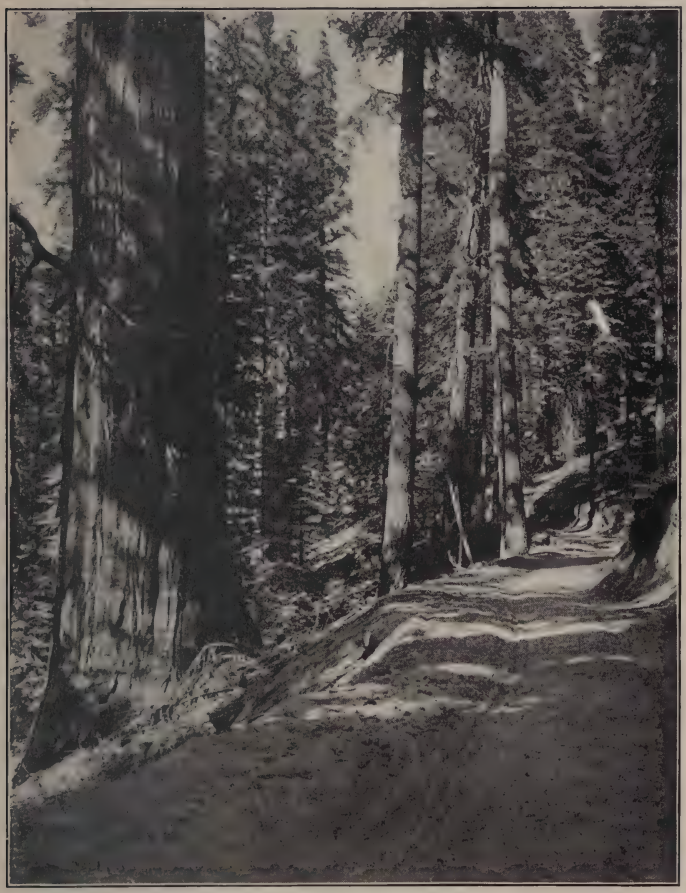
Considering the far-reaching influence of the Parks on the general welfare, in a few years they might be placed under a cabinet officer who could appropriately be called the Secretary of National Parks.

XVI

THE SPIRIT OF THE FOREST

THE supreme forest of the world is in the Sequoia National Park. The Big Trees have attained here their greatest size and their grandest development. Here is the forest's most impressive assemblage. In these groves at the southern end of the splendid Sierra is all the eloquence of wooded wilds — the silence of centuries and the eternal spirit of the forest. This forest is to be guarded and saved forever.

How happily trees have mingled with our lives! Ever since our lowly ancestors crawled from gloomy caves, stood erect in the sunlight, wondered at this calm, mysterious world, and at last made homes beneath the hemlock and the pine — ever since then, down through the ages, through the dim, sad centuries, all the way from cave to cottage, the forest has been



ON THE ROAD TO SHERMAN TREE
GIANT FOREST, SEQUOIA NATIONAL PARK

a mother to our good race. How different our history had this wooded and beautiful world been treeless and lonely! Groves stand peaceful and prominent on every hill, in every dale of history that encourages or inspires. If we should lose the hospitality of the trees and the friendship of the forest, our race too would be lost, and the desert's pale, sad sky would come to hover above a rounded, lifeless world. The trees are friends of mankind.

The forest that you see on the heights across the valley, that stands so steadfast upon the billowed and broken slopes, that drapes the dales and distances with peaceful, purple folds, and makes complete with grace and grandeur a hanging garden of the hills — this is the forest that sheltered our ancestors through the past's slow-changing years.

The trees have wandered over the earth and prepared it for our race. Their low green ranks encircle the cold white realm of Farthest North; they grow in luxuriance

beneath the equatorial sun; they have climbed and held the heights though beaten and crushed with storm and snow; they have dared the desert's hot and deadly sand; they stand ankle-deep in bayous wrapped in tangled vines; they have breasted the surf and pushed out into the surges of the ocean; they have conquered and reclaimed the rocks on continents and islands; they have plumed with palms the white reefs of the blue and billowed sea; their triumphant masses stand where the Ice King rules; and in volcanoes' throats they have given beauty for ashes. Their banners wave under every sun and sky. Wherever our race has gone to live, the trees have given welcome and shelter.

The picturesque woodsman with his axe has helped to build nations and to improve and sustain them after they were built. He will play his part in the future. An axeman at work in the woods makes even a more stirring and romantic picture than

does the reaper in his harvest home on autumn's golden fields. It is good to hear the sounds of the axe as they echo and reëcho among wooded wilds and then fade away, a melody amid the forested hills. The echoes of the axe suggest the old, old story — tell of a love-touched dream come true, of another home to be. When under the axe an old tree falls, it is the end of a life well lived, the end of a work well done. But this tree may rise, helped and shaped by happy hands, and become the most sacred place in all this world of ours — a home where lovers live — a cottage with hollyhocks and roses by the door.

But we are leaving the low-vaulted past. These trees are not to fall. They are to stand. In parks, we have provided for trees a refuge with ourselves. They are to live on, and with them we shall build more stately mansions for the soul.

Trees have trials. They know what it is to struggle and grow strong. With hardship they build history, adventure, pathos,

and poetry. Every tree has a life full of incident. Aged trees are stored with the lore of generations, carry the character of centuries, have biographies, stirring life-stories. A sequoia is an impressive wonder. As the oldest settler upon the earth — the pioneer of pioneers — it knows the stories of centuries. At the dead lips of the Sphinx you listen in vain, but beneath a Big Tree the ages speak and the centuries shift their scenes. The Big Trees carry within their untranslated scrolls that which may enrich the literature of the world. Within a Big Tree's brave breast are more materials of fact and fancy than in the ocean's coral cove, or in the murmuring sea-shell on the shore.

In the forest, around the foot of a tree, rages an endless and ever-changing struggle for existence. Here from season unto season a thousand forms of life feed and frolic, live and love, fight and die. Here Nature's stirring drama is playing on and always on. Here are trials and triumphs,

activity and repose, and all the woodland scenes upon the wild world's stage amid the splendors and the shadows of the pines. At this place Nature smiles and sings, and here, at times, the lonely echo seems to search and seek in vain.

I never see a little tree bursting from the earth, peeping confidingly up among the withered leaves, without wondering how long it will live, what trials or triumphs it will have. I always hope that it will be a home for the birds. I always hope that it will find life worth living, and that it will live long to better and to beautify the earth.

In spring, summer, autumn, and winter, the broadleaf forest is a picture gallery, a fine-arts hall. In winter, abloom with snow flowers or in penciled tracery against the sky, how trustfully it sleeps! Confidently and in perfect faith, it awaits the supreme day of spring, when, amid the buzzing of bees, the songs of mating birds, and the unfolding of green and crumpled

leaves, comes the glory-burst of bloom. In leaf-filled summer the woodlands are a realm of rich content. But in reflective autumn, when the plaintive note of the bluebird has Southland in its tones, when the hills are golden, then the work of the leaves is done and they come out in garments of glory to die — to die like the sunset of a splendid day. Color is triumphant when autumn, the artist, touches the trees, for then the entire temperate zone encircling this rounded world is a wreath of glory. This wreath fades or falls away; and the little golden leaf that casts its lot upon the breeze and floats off in the midst of mysteries is upon a journey just as dear as when, amid the mists of sun and spring, it did appear.

The woodland world of the mountains in National Parks is a grand commingling of groves and grass-plots, crags and cañons, and rounded lakes with forest frames and shadow-matted shores that rest in peace within the purple forest. Here, in Na-

ture's mirrors, pond-lilies, all green and gold, rise and fall on gentle swells, or repose with reflected clouds and stars. Here, too, are drifts of fringed gentians, blue flakes from summer's bluest sky. Here young and eager streams leap in white cascades between crowding crags and pines. In these pictured scenes the birds sing, the useful beaver builds his picturesque home; here the cheerful chipmunk frolics and never grows up; and here the world stays young. Forests give poetry to the prose of life and enable us to have and to hold high ideals.

In almost every forest is the quaking aspen, the most widely distributed tree in the world. In autumn its golden banners encircle the globe and adorn nearly one half the earth. Though this tree has a constitution so tender that it is easily killed by fire or injury, it is one of the greatest pioneer trees in the forest world. Through the ages the restless aspen leaves appear to have attracted the attention

of mankind. Unfortunately the old myths and legends concerning this merry, child-like tree told of fear or sorrow, but now every one catches the hopeful spirit of the aspen. Aspens are youth, eternal youth. Endlessly their dancing leaves proclaim youth. They are romping children. Their bare legs, their mud- and water-wading habits, their dancing out of one thing into another, are charmingly, faithfully child-like.

Every tree has the ways of its race. The willow in its appointed place is ever leaning over watching the endless procession of waters. Does it wonder whence and whither? The birches are maidens, slender, white, and fair. The maple has its own excuse for being. The elms arch the woodland world with cathedral art. Beautiful is the lone silver spruce lingering among the grand golden lichened crags. The sturdy pines stand in ever green contentment. The straight spruces and stately firs point ever upward and never cease to

call "Excelsior!" nor to climb toward their ideal. The oak, full of character, welcomes all seasons and all weathers. Within the forest, up toward the heights, stands a tree that wins and holds the heart like a hollyhock. This tree, the hemlock, is a poem all alone. It is the heroine, the mother spirit of the woodland world, handsome, richly robed, symmetrical, graceful, sensitive, and steadfast. She, more than any other tree, appeals to the eye and the heart. In her upcurving arms and entire expression there is a yearning. When the world was young she may have been the first tree to shelter our homeless, wandering race. To-day, when the wild folk of the outdoors are most beset with cold or storm, they go trustingly and confidingly to nestle in the hemlock's arms. And rightly the sequoia is the nobleman of all the forest world.

That sweet singer, the solitaire, is the chorister of the forest. He puts the woods in song. Hear his woodnotes wild and the

Spirit of the Forest will thrill you! Meditations and memories will throng you. His matchless melody carries echoes of Orpheus and good tidings from distant lands where dreams come true. Far away, soft and low, the wood itself seems to be singing a hopeful song, a rhythm of ages, that you have heard before. Pictured fairyland unfolds as you listen. In it is the peace, the poetry, the majesty, and the mystery of the forest.

Go to the trees and get their good tidings. Have an autumn day in the woods, and beneath the airy arches of limbs and leaves linger in paths of peace. Speak to the jostling little trees that are so pretty and so eager. Stand beneath the monarchs, rugged and rich in character. Lie down upon the brown leaves, and look far away through the slowly vanishing vistas full of forest, of columns that are filled with kindest light. Leaves of red, bronze, and gold will rest in the sunlight, or be falling back to earth without a fear.

The brook will murmur on; around, the falling nuts may patter upon the fallen leaves; the woodpecker may be tip-tapping; the birds will be passing for the Southland; the squirrels will be planting for the ages. Though there are stirring activities and endless fancies, your repose will be complete. Here where the lichen-tinted columns of gray and brown are rich and beautiful in the mellow light, you will be at your best — your own will come to you — with the Infinite you will be in tune. Stay till night, and from the edge of the woods see the sun go down in triumph. While all is hushed, watch the castled crag and the gnarled pine on the hilltop blacken against the golden afterglow. In the reflective twilight hour you may catch the murmur and the music of the wind-touched trees.

I wish that every one might have a night by a camp-fire at Mother Nature's hearthstone. Culture began by a camp-fire in the forest. Ages and ages ago, lightning one rainy evening set fire to a dead tree near

the entrance to a cave. The flames lured some of our frightened ancestors from their cheerless lair, and as they stared at the burning wood, they pushed back their long tangled hair, the better to watch the movements of the mysterious flames. Around this fire these primitive people gathered for the first social evening on the earth. When in the forest one sits within the camp-fire's magic tent of light, amid the silent, sculptured trees, thrilling through one's blood go all the trials and triumphs of our race. A camp-fire in the forest marks the most enchanting place on life's highway wherein to have a lodging for the night.

Weird and strange are the feelings that flow as winds sweep and sound through the trees. Now the Storm King puts a bugle to his lips, and a deep, elemental hymn is sung while the blast surges wild through the pines. Soon Mother Nature is quietly singing, singing soft and low, while the breezes pause and play in the pines. From the past one has been ever coming, with the future

is destined ever to go, when with centuries of worshipful silence one waits for a wind in the pines. Ever the good old world grows better, both with songs and with silence, in the pines.

One touch of forest nature makes the whole world kin. A tree is the flag of Nature, and forests give a universal feeling of good will. In the boundless forest the boundary-lines of nations are forgotten. Some time an immortal pine may be the flag of a united and peaceful world. In the forests' fairyland are still heard "the horns of Elfland faintly blowing." There —

> "Echoes roll from soul to soul,
> And grow forever and forever."

Kinship is the spirit of the forest.

XVII

WILD LIFE IN NATIONAL PARKS

HUNTERS are excluded from National Parks, and within these wonderlands all shooting is prohibited. All National Parks are wild-life sanctuaries, places of refuge for birds and animals. There the wild folk are not pursued, trapped, or shot. Nearly all the principal birds and beasts of North America are to be found in these Parks. Here may be seen the lively, merry play-pranks of young bears, young birds, and young beavers. Each Park is thus a wild-life paradise where the animals are safe, free from the fear of being killed by man. These Parks are ideal places in which to enjoy the animals and to study their character; and they are a happy hunting-ground for the hunter who carries the camera. Recreation in these wonderlands is thus absolutely separated from the butchering business.

ELK IN JACKSON HOLE

What a glorious exchange! All this should help the good old world to grow better. Making a wild-animal place of refuge is equivalent to making a park-place of refuge for ourselves.

One day, in what is now the Rocky Mountain National Park, I came upon a luxuriously equipped camping-party, in which were at least a score of people. They had a splendid outfit and bore evidence of culture and refinement. I came upon their camp just at the close of a day that they had devoted to a hunting-contest. I do not recall the prize that the winning side secured, but all members of the party, young and old, men and women, had engaged in the contest. They had taken sides, and each side had endeavored during the day to kill more animals than the other. Every living thing was allowable. Piled up against a log near the camp were two heaps of dead wild folk — squirrels and chipmunks, grouse and hummingbirds, water-ouzels, ptarmigans, bluebirds, a robin, a wren, a snow-

shoe rabbit, and I know not how many others.

People who engage in this kind of sport have characters that I cannot understand. These people, with all the advantages of culture and refinement, were out in the wild, lovely, splendid scenes. They had forgotten all other forms of recreation or enjoyment and had sunk back into barbaric blood-shedding "sport."

Man has appeared to the furred and feathered wilderness people as a wanton murderer. Animals have been constantly in danger, and nowhere nor at any time were they safe. Too often animals have been called cowards. They have grown shy and wild from necessity. Their life has depended on keeping out of the way of man. Along with the getting of food, their chief concern is "safety first." This requires that they be eternally vigilant to flee from the near presence of man. The invention of the long-range repeating rifle added a large element of fear and con-

sequent shyness to the life of the wild people.

But now our National Parks are reforming man. The wildest of animals quickly become half-tame in any place that is safe. During the past few years thousands of excellent photographs have been made of big game in National Parks. Elk, antelopes, and mountain sheep have been photographed singly and in groups at the distance of only a few yards.

"It is better to let the wild beast run
And let the wild bird fly;
Each harbors best in his native nest,
Even as you and I."

None of the big animals in the United States are ferocious. In parks it is men, not animals, who are on their good behavior — his hand restrained, man temporarily becomes as inoffensive as the animals. It may be, if we quit shooting animals on one side of a Park boundary-line, that in due time we shall become sufficiently civilized to stop killing people

on the other side of a national boundary-line.

That the habitual wildness of birds and animals is the result of experience, rather than instinct, was forcefully illustrated to me by a surprise that I enjoyed with wild mountain sheep in a side cañon of the Colorado River in Arizona. Bighorn sheep are proverbially alert and wild. Imagine my astonishment when two or three of a flock of bighorns walked up and touched me with their noses! Evidently they had never before seen man. Trustfully they approached to satisfy their native curiosity.

For a number of days I was close to this flock, and several times I walked among them. They showed no excitement; they had nothing to fear. Without doubt, they had not been fired upon, chased, or even approached by man before. When I started for other scenes, one of the ewes of this wild herd followed me for more than an hour. Here were wild animals in a truly natural state! The abundance of easily

watched bird and animal life in these numerous Parks affords a splendid opportunity to learn how these so-called wild people live and who they are.

Our greatest animal is the grizzly bear. In the Parks we may make his acquaintance. The story of "Ben Franklin," who was reared by James Capen Adams, "Grizzly Adams," an early mountaineer and hunter of California, tells of a noble grizzly bear.

While hunting in the Yosemite in 1854, Adams killed a mother grizzly and captured two tiny cubs. A greyhound suckled them, and Adams kept one of the cubs — Ben Franklin. Ben was never chained, but followed his master everywhere through the mountains with a devotion equal to that of a faithful dog. Adams always treated him with kindness and understanding, and trained him to carry huge packs. Ben also rendered other startling services.

One day, while returning from a hunt with Ben at his heels, Adams suddenly

came upon a mother grizzly and three cubs in the close quarters of a thicket. The unexpected encounter probably caused the big bear to defend her cubs, and she sprang upon Adams before he could fire his rifle. He was knocked down and seriously wounded. Though still a youngster, Ben was grandly loyal and brave; he instantly sprang at the huge bear's throat and put up a courageous fight. This distracted the big bear's attention and gave Adams a chance to spring out of harm's way and shoot her. Little Ben was terribly bitten. So grateful was Adams that he dressed Ben's wounds before he attended to his own. Both Adams and Ben survived, and ever after they were close companions.

For brain-power, prowess, and sheer force of character the grizzly is the king of the wilderness. He knows it, and therefore is the aristocrat of the wilds. With real intelligence, and, if kindly tamed, with wonderful loyalty and devotion, he is an outdoor citizen of high type, and does not

merit the extermination that threatens him.

A grizzly is ever alert, vigilant, and cautious, unless his well-developed bump of curiosity temporarily hypnotizes him and betrays him into momentary dullness and forgetfulness. He is not a coward, but simply believes in preparedness and safety first, and so seldom blunders into trouble. He is popularly believed to be ferocious. Two or three generations ago he may have been fierce, but he is not so now. He uses his keen wits to avoid man, and never attacks wantonly nor fights if he can avoid it. But he is a masterful fighter, with strength, endurance, courage, mentality, and prompt action in emergencies.

There is little that the grizzly or the black bear will not eat. Fresh meat or carrion, honey, grasshoppers, ants, grubs, fish, mice and others pests, grass, fruits, berries, bark, roots, leaves — all may be included in the bill of fare of this omnivorous feeder. The grizzly appears more in-

clined to belong with vegetarians than with the Carnivora. He hibernates from three to five months each winter. The latitude, altitude, snowfall, weather, and the peculiarities and condition of the bear determine the length of his hibernation. Before entering a cave or opening to spend his hibernating sleep he fasts for a few days. In the spring, for several days after he emerges he eats little.

Except the Alaskan bear, the only other kind we have is the black bear. His habits are similar to the grizzly's, but he is smaller than the grizzly. The color of bears varies widely in the same family as well as in the two species and numerous subspecies. Color has nothing to do with the kind of bear: either the black or the grizzly may be black or cinnamon. The black bear is much more playful, and he climbs trees as readily as a cat. The grizzly does not climb into trees.

The black bear is a playful bluffer. One day, as I was seated on the edge of Yellow-

BLACK BEAR CUBS, SEQUOIA NATIONAL PARK

stone Lake, several feet above the water, a young black bear came ambling by. In passing, he leaped at me with a wild "woof." His bluff was effective. I shrank back, and tumbled into the lake.

The creation of the Yellowstone National Park, for "the benefit and enjoyment of the people," was one of the great achievements for mankind. It also was a great event in the world of wild folk. The Yellowstone is one of the greatest wild-life sanctuaries in the world. In its thirty-three hundred square miles are numerous varieties of wild animals. Each summer as many as sixty thousand elk feed in it, and there are also buffaloes and antelopes, and flocks of sheep and herds of moose. Black bears are on every hand, and grizzly bears are often seen near by.

The caribou of the North make a long north-and-south migration with the seasons. The deer and the elk of the mountain parks, like many birds, simply migrate up and down the heights, spending summers in

the high altitudes and winters in the foothills.

On the thousand hills, meadows, crags, and moorlands of the National Parks are herds, flocks, and bands of elk and moose and deer and the agile mountain sheep. There are more than five hundred kinds of birds. A census of wild-life folk in all National Parks would show a numerous population: possibly a hundred thousand elk, half as many deer, several thousand sheep, a few thousand goats, several hundred antelopes, a few hundred moose, a thousand or so of bears, many thousand beavers; minks, conies, marmots, and muskrats in uncountable thousands; and birds in untold millions.

The antelope is a strange, isolated species. Formerly it ranged widely over the plains, but now it is almost exterminated. It has no dewclaw. It can erect and depress its fluff of white tail at will; this is a means of signaling. Of all big game, the antelope perhaps is the fastest runner. This animal

sheds the outer part of the horns each year, retaining the spikelike core.

The gray wolf, coyote, fox, lynx, otter, skunk, and porcupine are numerous in the Parks. The porcupine, even at his wildest, shows the least signs of fear and is the dullest-witted animal in the woods.

Glacier Park probably excels in the number of mountain goats. Here they are to be seen in one of the most picturesque and precipitous ranges, in topography which goats enjoy. The Rocky Mountain Park probably excels in the number of bighorn sheep.

Along the streams the picturesque beaver, a permanent home-builder, lately almost exterminated, is reëstablishing himself and restoring the scenes that were known to the pioneers.

The food of the beaver is the bark of aspen and willow trees. He does not eat fish or meat. Instead of hibernating in winter, beavers harvest a quantity of food-supplies in the autumn and store them for

winter use. These are piled in the water beside their house. After gnawing down trees, cutting them into sections, and eventually eating the bark, they use the wood in constructing dams and houses.

Besides taking thought for the morrow, they build permanent homes, and keep them clean and in repair. They skillfully construct dams and canals to insure a constant water-supply in which to live, work, play, and travel. These give a charm to landscapes, and are a benefit to mankind. Beavers were the world's first engineers and the first conservationists. They have industry, patience, and persistence, combined with mental power.

They live in colonies or communities. Evidently they know the wisdom of the old saying "All work and no play," etc., for they often play as well as work, and also take a long summer vacation. Excellent workers as they are, they avoid unnecessary labor and do less of it than any other animal I know. There were civic centers

in the animal world long before man conceived such an idea for himself.

The mountain lion is one of the slyest and most elusive animals in the woods. Rarely is it seen, although its keen curiosity leads it to come close to camping-parties and to follow individuals through the woods.

On the lower slopes of most Parks a few snakes are found, but they are wholly absent from the middle and the higher slopes.

In most of the Park streams trout are found — Western brook trout, Eastern brook trout, and California rainbow trout.

Among the more prominent birds common in a number of the Parks are eagles, grouse, ptarmigans, Clarke crows, camp-birds, — Rocky Mountain jays, — robins, bluebirds, blackbirds, song sparrows, white-crowned sparrows, cañon wrens, solitaires, and water-ouzels. In several of the National Parks a number of species of hummingbird are found.

Each spring many species of birds mi-

grate up the mountain-slopes, where they nest in the alpine heights. The mountain migration, requiring a flight of only an hour or two, gives them climatic conditions similar to that of the Arctic Circle, to reach which would cost them a journey of several thousand miles.

Some species bring forth two broods each summer. The first is raised in the lowlands, where the young are fed while flower life in the lowlands is at its best. As soon as the young birds are able to care for themselves, the parent birds move up the mountain-side into the very heart of summer. Here they nest again. How romantic is every habit and custom in Bird World! The second nest of children is thus reared on the alpine slopes. This enables the old birds to bring up each brood in the midst of an abundant food-supply. The white-crowned sparrow and two or three species of hummingbird do this.

A closer study of birds and animals will probably reveal the fact that numbers of

them mate for life. My experience has led me to believe that wolves and foxes, bluebirds, wrens, eagles, and other kinds of wild life do this.

Of all the birds in the West, or in the world, the one most hopefully eloquent is the solitaire. The song of the hermit thrush has a touch of sadness — it subdues and gives to one a touch of reflective loneliness; but the song of the solitaire stirs one to be up and doing; it gives the spirit of youth. Its song comes from ages of freedom under peaceful skies, from a mingling of the melody of winds and waters and of all rhythmic sounds that murmur and echo through Nature's wonderlands.

High up in the mountains of the National Parks lives the ptarmigan, the largest bird resident of the snowy heights. It spends the entire year in the alpine zone, rarely descending below timber-line. Even the summits of the peaks are visited by this sky-high dweller. Its dress changes with the seasons; in winter it is pure white,

stockings and all; in midsummer it is grayish brown. These changing colors resemble those of the landscape and thus help protect the ptarmigan from its enemies, the weasel, fox, bear, eagle, and mountain lion. Although smaller than the grouse, it reminds one of that bird. It eats grasses and insects and the seeds and buds of alpine plants. Much of the winter-time is spent by these birds in the shelter of deep holes or runs beneath the compressed snow of the heights. Though far from the Arctic Circle, they are close relatives of the ptarmigan that dwells in the realm of the polar bear.

One of the best-dressed and best-mannered bird families that visit National Parks is that of the waxwing — cedar and Bohemian. These birds usually travel in flocks. At a small watering-place they drink in routine, moving forward in an orderly manner. When a number of them are resting upon a limb, if one catches an insect, he is quite likely to pass it to his neighbor,

and the neighbor in turn to pass it to the next neighbor. Their dress is quiet, refined, and attractive to a marked degree. It is an interesting fact that these birds, so dainty of dress, so refined of manner, do not sing.

The cañon wren is a beautiful singer. So, too, is the water-ouzel, a bird of the alpine brooks in the mountains of the West that has been immortalized by John Muir. But few species of birds sing every day in the year. One of those that do is the water-ouzel.

Most birds and animals appear to desire human society. Birds will leave the seclusion of the forest to build by the roadside where people pass. Some kinds of little feathered folk have deserted old nesting-scenes and now nest by human homes. Robins, wrens, and bluebirds confidingly raise their families in the scenes where children romp and play.

They may do this for better food opportunities and increased safety from enemies, but it is also plain that many birds

come chiefly to satisfy their desire for human society. It has been often demonstrated that shy, well-fed birds and animals are hoping and waiting for friendly advances on our part. Wild neighbors are glad of the opportunity to call on us, whether we break bread or not. They are also glad to have friendly calls returned. Birds and animals have individuality. Food and kindness, and speaking to animals in the universal language — friendly tones — are all means of promoting acquaintance.

In the past we have greatly underrated the mental powers of animals. An intimate association with wild life in the Parks will probably convince most people that wild animals have the power to think and reason. It may also acquaint people with the fact that animals as well as human beings possess the traits of love, hatred, jealousy, anger, and revenge. Any one who associates much with wild life will discover the exceptional keenness of animal senses. In most animals scent is amazingly developed,

and probably is the first of the senses to warn them of danger.

Most animals may be spoiled by excessive or improper feeding. In the Yellowstone Park the bears, which are omnivorous feeders, have free access to the garbage-dumps and eat all sorts of unwholesome abominations. This improper eating is bound to have a bad influence upon their habits, and is already spoiling their disposition. Beasts of prey in the Parks are held in check by the Government. Lions, lynxes, and other animals that become numerous and destructive, or bears that develop killing habits, are disposed of by the Government.

The excess of big game and birds in the Parks overflows and stocks the territory outside. Each year, too, hundreds of elk and other big animals are shipped from Yellowstone to many parts of the country. Well might these Parks supply city zoos, or, better still, big wild-life reservations, with all available kinds of animals needed.

As well ship deer, moose, bears, beavers, and antelopes as to ship elk. Here is a large field for the distribution of wild life all over the United States. The general restocking of state and government wild-life reservations may enable cities to cease maintaining their animal prisons — the zoos.

XVIII

IN ALL WEATHERS

THE seasons for visiting National Parks are spring, summer, autumn, and winter! Morning, noon, the sunset hour, under the stars and with the moon — all times, each in its way, are good for rambling in these places of instruction and delight. I have climbed numerous peaks by moonlight and starlight, and have stood on the summit of the Continental Divide with the winter moon. Nature is good at all times. Rainy days, gray days, windy days, all have something for you not ordinarily offered. So, too, have the sunny winter days when upon the dazzling snow fall the deep-blue shadows of the pines. Forget the season and the weather; visit the Parks when you can stay there longest.

One day heavy clouds rested upon the snowy earth around my cabin, nine thou-

sand feet above sea-level. In these, and in the falling snow, I started up the Long's Peak trail, in what now is the Rocky Mountain National Park. I wished to measure the storm-cloud's vertical depth and to observe its movements. Only a ravine and instinct enabled me to snow-shoe through the blinding, flying snow and almost opaque sheep's-wool cloud. The cloud was three thousand feet thick.

Suddenly, at twelve thousand feet, the depth of snow became markedly less. Within a few rods I burst through the upper surface of the cloud into brilliant sunshine! Not a bit of snow or cloud was there above this upper level.

From a high ridge I watched the top surface of the storm-cloud as it lay before me in the sun — a silvery expanse of unruffled sea, pierced by many peaks. Half a mile above towered vast, rugged Long's Peak. Like a huge raft becalmed in a quiet harbor, the cloud-sea moved slowly and steadily, almost imperceptibly, a short

distance along the mountains; then, as if anchored in the center, it swung in easy rotation a few degrees, hesitated, and slowly drifted back. Occasionally it sank, very slowly, several hundred feet, only to rise easily to its original level.

With wonder I long watched this beautiful sunny spectacle, finding it hard to realize that a blinding snow was falling beneath it. Later I learned that this snowfall was thirty inches deep over several hundred thousand square miles; but it fell only below the altitude of twelve thousand feet and not on the high peaks.

Mountain-tops have more sunshine and fewer storms than the lowlands. The middle slopes of a peak regularly receive heavier falls of rain and snow than does the summit.

The rugged mountains in all Parks are wonderful in the snow. Snowshoe excursions, climbs, skiing — all the sports of winter — may be enjoyed in these magnificent wilds. Mountains in winter hold

splendid decorations — sketches of black and white, ice architecture, rare groups that form a wondrous winter exhibition. Forests, cañons, meadows, plateaus and peaks, where hills of snow and gigantic snow cañons form dazzling structures and new topography, are marvelous exhibitions. The thousand and one decorations of frost and snow-flowers are treasures found only under the winter sky.

During a high wind one winter, as I fought my way up Long's Peak, above timber-line I was pelted with gravel and sand till the blood was drawn. The milling air-currents simply played with me as they swept down from the heights. I was knocked down repeatedly, blown into the air, and then dropped heavily, or rolled about like some giant's toy as I lay resting in the lee of a crag. Standing erect was usually impossible and at all times dangerous. Advancing was akin to swimming a whirlpool. At last I reached the buzzing cups of an air-meter I had previously

LONG'S PEAK FROM CHASM LAKE
ROCKY MOUNTAIN NATIONAL PARK

placed in Granite Pass, twelve thousand feet above sea-level. This instrument was registering the awful wind-speed of one hundred and sixty-five miles an hour! It flew to pieces later during a swifter spurt.

Although I intended going no farther, the wild and eloquent elements lured me to keep on to the summit of the peak, nearly three thousand feet higher. All my strength and climbing knowledge were necessary to prevent me from being blown into space. Gaining each new height was a battle. Forward and upward I simply wrested my way with an invisible, tireless contestant who seemed bent on breaking my bones or hurling me into unbanistered space.

In one rocky gully the uprising winds became so irresistible that I had to reverse ends and proceed with feet out ahead as bracers and hands following as anchors. There was no climbing from here on: the blast dragged, pulled, and floated me ever upward to the sunny, wind-sheltered

Narrows. The last stretch was a steep icy slope with a precipice beneath. Casting in my lot with the up-sweeping wind, I pushed out into it and let go. Sprawling and bumping upward, I had little else to do but guide myself. At last I stood on the top and found it in an easy eddy — almost a calm compared to the roaring conditions below. Far down the range great quantities of snow were being explosively hurled into the air, then thrown into spirals and whirls that trimmed the peak-points with gauzy banners and silky pennants, through which the sunlight played splendidly.

Stirring and wild, wonderful scenes are encountered during storms on mountain-tops, by the lakeshore, and in cañons. The dangers in such times and places are fewer than in cities. Discomforts? Scarcely. To some persons life must be hardly worth living. If any normal person under fifty cannot enjoy being in a storm in the wilds, he ought to reform at once.

In the intensity and clash of the elements there is a vigorous building environment. The storms furnish energy, inspiration, and resolution. There are no substitutes "just as good," no experiences just as great.

One rainy June day I started up a dim steep trail toward the headwaters of the river St. Vrain, near timber-line in what is now the Rocky Mountain National Park. While enjoying the general downpour and its softened noise through the woods, I was caught in a storm-center of wrangling winds and waters, and was almost knocked down. Like a sapling, I bowed streaming in the storm. Later, as I sat on a sodden log, reveling in the elemental moods and sounds, a water-ouzel began to sing, but I heard little of his serene optimistic solo above the roar of the wind and stream.

The storm raged louder as I approached timber-line. Clouds dragged among the trees. I could see nothing clearly. Every breath was like swallowing a wet sponge. Then a wind-surge rent the clouds and

let me glimpse the blue sun-filled sky. I climbed an exceptionally tall spruce. A comic Frémont squirrel scolded in rattling, jerky chatter as I rose above the sea of clouds and trees. Astride the slender tree-top, I felt that the wind was trying hard to dislodge me, but I held on. The tree quivered and vibrated, shook and danced; we charged, circled, looped, and angled. Nowhere else have I experienced such wild, exhilarating joy. In the midst of this rare delight the clouds rose, the wind calmed, and the rain ceased. Then suddenly a blinding, explosive crash almost threw me from my observatory. Within fifty feet a tall fir was split to the ground. Quickly climbing back to earth, I eagerly examined the effects of the lightning-stroke. With one wild blow, in a second or less it had wrecked a century-old tree.

Although I have rarely known lightning to strike the heights, I have frequently experienced peculiar electric shocks from

the air. I have never known such electrical storms to prove fatal nor to leave ill effects; and they may be beneficial. The day before the famous Poudre Flood, in May, 1904, I was traveling along the Continental Divide above timber-line near Poudre Lakes. While resting I was startled by the pulsating hum, the intermittent *buzz-z-z-z* and *zit-zit* and the vigorous hair-pulling of electricity-laden atmosphere.

Presently my right arm was momentarily cramped, and my heart seemed to lurch several times. These electric shocks lasted only about two seconds, but recurred every few minutes. The hair-pulling, palpitation, and cramps seemed slightly less when I fully relaxed on the ground. When I tried to climb, I found myself muscle-bound from the electricity. Points of dry twigs momentarily exhibited tips of smoky blue flame, and sometimes similar flame encircled green twigs below the lower limbs.

Later that day I came to North Specimen Mountain. There the electrical waves weakened or entirely ceased while I was in shadow, but they remained quite serious in the sun. I breathed only in gasps, and my heart was violent and feeble by turns. I felt as if cinched in a steel corset. After sundown I was again at ease and free from this strange electrical colic, which often worries or frightens strangers the first time they experience it. I soon forgot my own electrical experiences in the enjoyment that night of the splendidly brilliant electric effects beneath the enormous mountain-range of cloud-forms over the foothills. Its surface shone momentarily like incandescent glass, and occasionally down the slopes ran crooked rivers of gold.

I have had the good fortune to see geysers by sunlight, by moonlight, during gray stormy days, and also while the earth around them was covered with snow.

By moonlight the mountainous National Parks are enchanted lands. There

is a gentleness, a serenity, and a softness that is never known in daylight. Many a time I have explored all night long. The trail is strangely romantic when across it fall the moon-toned etchings of the pines. The waterfalls, crags, mountain-tops, forest glades, and alpine lakes have marvelous combinations of light and shade, and they stir the senses like music. I wish that every one might see in the moonlight the Giant Forest in the Sequoia National Park, or timber-line in the Rocky Mountain National Park. By moonlight the Big Trees will stir you with the greatest elemental eloquence. Those who go up into the sky on mountains in the moonlight will have the greatest raptures and make the highest resolves.

Miss Edna Smith is one of the most appreciative outdoor women I ever have known. Years ago I urged her to know the mountains at night. Here is one of her accounts of a night experience: —

At supper-time the chances seemed against a start. It was raining. Later the rain stopped, but the full moon was almost lost in a heavy mist and the light was dim. Mr. S. N. Husted, the guide, thought an attempt to ascend Long's Peak hardly wise. At eleven o'clock I went to Enos Mills for advice. He said, "Go." So we mounted our ponies and started, chilled by the clammy fog about us.

After a short climb we were in another world. The fog was a sea of silvery clouds below us and from it the mountains rose like islands. The moon and stars were bright in the heavens. There was the sparkle in the air that suggests enchanted lands and fairies. Halfway to timber-line we came upon ground white with snow, which made it seem all the more likely that Christmas pixies just within the shadows might dance forth on a moonbeam.

Above timber-line there was no snow, but the moonlight was so brilliant that the clouds far below were shining like misty lakes, and even the bare mountainside about us looked almost as white as if snow-covered.

As we left our ponies at the edge of the Boulder Field and started across that rugged stretch of débris spread out flat in the brilliant moonlight, we found the silhouette of Long's Peak thrown in deep black shadow across it.

Never before had that bold outline seemed so impressive.

At the western edge of Boulder Field there was a new marvel. As we approached Keyhole, right in the center of that curious nick in the rim of Boulder Field shone the great golden moon. The vast shadow of the peak, made doubly dark by the contrast, made us very silent. When we emerged from Keyhole and looked down into the Glacier Gorge beyond, it was hard to breathe because of the wonder of it all. The moon was shining down into the great gorge a thousand feet below and it was filled with a silvery glow. The lakes glimmered in the moonlight.

Climbing along the narrow ledge, high above this tremendous gorge, was like a dream. Not a breath of air stirred, and the only sound was the crunch of hobnails on rock. There was a supreme hush in the air, as if something tremendous were about to happen.

Suddenly the sky, which had been the far-off blue of a moonlit night, flushed with the softest amethyst and rose, and the stars loomed large and intimately near, burning like lamps with lavender, emerald, sapphire, and topaz lights. The moon had set and the stars were supreme.

The Trough was full of ice and the ice was hard and slippery, but the steps that had been

cut in the ice were sharp and firm. We had no great difficulty in climbing the steep ascent. We emerged from the Trough upon a ledge from which the view across plains and mountain-ranges was seemingly limitless.

As we made our way along the Narrows the drama of that day's dawn proceeded with kaleidoscopic speed. Over the plains, apparently without end, was a sea of billowy clouds, shimmering with golden and pearly lights. One mountain-range after another was revealed and brought close by the rosy glow that now filled all the sky. Every peak, far and near, bore a fresh crown of new snow and each stood out distinct and individual. Arapahoe Peak held the eye long. Torrey's Peak and Gray's Peak were especially beautiful. And far away, a hundred miles to the south, loomed up the summit of Pike's Peak. So all-pervading was the alpine glow that even the near-by rocks took on wonderful color and brilliance.

Such a scene could last but a short time. And it was well for us, for the moments were too crowded with sensations to be long borne. Soon the sun burst up from the ocean of clouds below. The lights changed. The ranges gradually faded into a far-away blue. The peaks flattened out and lost themselves in the distance. The near-by rocks took on once more

their accustomed somber hues. And in the bright sunlight of the new day we wondered whether we had seen a reality or a vision.

On the summit all was bright and warm. Long we lingered in the sunlight, loath to leave so much beauty, but at last we began the descent leisurely. It was a perfect trip. It seemed as if the stage were set for our especial benefit. It was an experience that will live with me always. At first I felt as if I could never ascend the peak again, lest the impressions of that perfect night should become confused or weakened. But I believe I can set this night apart by itself. And I shall climb Long's Peak again.

To enjoy the Parks, we need but to go to them realizing that these wilderness realms are the greatest places of safety on the earth. The thousand dangers of the city are absent; the altitude of high mountains is not harmful but helpful — the air is free from dust and germs; and even the wildest and most tempestuous weather within them will bear acquaintance.

The animals in the wilderness are not ferocious, and they wisely flee from the coming of Christian people. Extraordi-

nary skill is required to get close to any wild animal. Even the camera will put the biggest wild folk to flight! They attack only in self-defense, only when cornered and assailed by the hunter. The animals that have survived and left descendants are those which used their wits for flight and not in ferocity. The grizzly constantly uses his wits to keep out of a locality where human beings are. Wolves may once have been ferocious, but at present the aggressive ones are those in the jungles of nature-faking; wolves keep apart from civilization, and travelers are not likely to go out of their way to find them. In story-books the mountain lion crouches upon the cliff or lies in wait upon a tree-limb to spring upon human prey; but real lions do not do this sort of thing.

Each year thousands of people scale peaks in the Rockies, the Sierra, and the Selkirks, or spend a less strenuous vacation in the heights, up several thousand feet above the sea. From anæmics who

stay at home they hear the common superstition that altitude is harmful! But the travelers return to their homes in high hopes and in vigorous health. The heights are helpful, and the outdoors is friendly at all times. These are splendid sources of hopefulness. They "knit up the raveled sleave of care." They arouse new interests, give broader outlooks. They are great blessings that every one needs.

There is a growing appreciation of the safe and sane outdoors. People are rapidly realizing that vacations in the Parks and wild places are needful first aids to impaired health, and also that outdoor life is absolutely necessary for sustained or increased efficiency. From the wilderness the traveler returns a man, almost a superman. Its elemental songs, pictures, and stories are a language of eloquent uplift. Go to the wilderness and get its good tidings! The wilderness is democratic and is full of ideas. It gives efficiency and sympathy. The mingling of all classes in

the Parks is a veritable blessing; it is one of the greatest means of preventing internal strife and also of averting international war.

Nature is an educational stimulus of rare force. The crumbling cliff, the glacial landscape, the wild, free clouds, birds, and trees, compel children — old and young — to observe and to think. They bring development and sympathy. They build the brain. They increase courage and kindness. Scenes and sunsets, cloud and storm, the stars and the sky, the music of wind and water, the purple forests, the white cascades, the colored flowers, the songs of birds, the untrimmed and steadfast trees, the shadows on the ground, the tangled grass, the round, sunny hills, the endless streams, the magic rainbow, and the mysterious echo — all these arouse thought, wonder, and delight in the mind of every child; and they have been the immortal nourishment of the great souls who have come from Mother Nature's loving breast to bless and beautify the world.

"The robe doth change the disposition." During summer vacations, the all-important rainy-day costume will save endless disappointment and worry. Rainy days will bear acquaintance — if you have clothes for the occasion. Cheerfulness and rainy days are united by waterproofs. One simply cannot cheerfully face a rainstorm in clothes that water will ruin. Hats or shoes that go to pieces in a downpour, skirts with colors that run — these mean the Waterloo of some one when the rain comes down. But an inexpensive hat, strong boots, and a raincoat — then let it rain!

When one is in the woods, the foremost thing to remember is the direction back to camp. In a general way this is answered in the familiar caution: "Stop, look, and listen!" A traveler through the woods should occasionally stop and make sure of the direction in which he is traveling. At every important bend in his course he should look ahead and notice the most conspicuous landmark directly

in front of him; then, about face for a look at the most important point or landmark that he has passed. He would thus be able, if he doubled on his own trail, to be guided by familiar objects, just as if he had traveled over it before in the same direction, with eyes open. Then, too, he should look to right and left for prominent or peculiar trees, cliffs, or other objects.

Keeping eyes thus open and mind alert is not a burden; it adds to the pleasure along the way. Any one who has thus traveled through strange woods should have taken a mental picture of what he has seen as he went on, and should be able to sit down and make a rough sketch of the locality and of his trail, showing the location of camp, the course he has traveled from it, and the prominent objects on both sides. A fair knowledge of woodcraft will enable any one to determine the points of the compass. While this is important, it is of less importance than remembering the direction to camp.

If a person gets lost, he would do well at once to climb into a tree-top, or to the summit of the highest near-by place, and from the commanding height survey the surrounding country. This may enable him to see a familiar landmark. If he fails to recognize any point, let him make a comparatively small circle with the purpose of picking up his trail. He should be careful to avoid aimless wandering, to which often lost people are so prone. This he may do by following along the summit of a ridge, or down the first brook or stream he can find. Of course, he will keep downhill in looking for running water. A few hours, or at most a few days, of stream-side travel will bring him where some one lives.

One is not likely to starve to death in the wilds. Starving is a slow process, and experiences show that a fast of a few days may be beneficial. Then, too, roots, berries, fruit, mushrooms, and tree-bark are to be found. With nothing but these, I have repeatedly lived for two weeks or

longer, even at times when I was most active in exploring or mountain-climbing.

If a man is hopelessly lost, and if he knows that his companions are sure to look for him, he should stop right where he is when he finds that he is lost, and should camp and light two signal fires, giving a call at intervals.

Go into the Parks and get their encouragement. Among the serene and steadfast scenes you will find the paths of peace and a repose that is sweeter than sleep. If you are dulled and dazed with the fever and the fret, or weary and worn, — tottering under burdens too heavy to bear, — go back to the old outdoor home. Here Nature will care for you as a mother for a child. In the mellow-lighted forest aisles, beneath the beautiful airy arches of limbs and leaves, with the lichen-tinted columns of gray and brown, with the tongueless eloquence of the bearded, veteran trees, amid the silence of centuries, you will come into your own.

Some time the grizzled prospector will lead his stubborn burro down the mountain and cease the search for gold; some time the miner will lay down his pick, blow out his lamp or his candle, and leave the worked-out mine; some time eternal night will come upon the gas- and coal-oil lamp; but our sunny hanging wild gardens — our Parks — are immortal; they will give us their beauty and their inspiration forever.

XIX

THE SCENERY IN THE SKY

THIS big round world carries in its heights four strange, marked features: the vast records of the Ice King; timber-line, the alpine edge of the forest; the mountain-top regions above timber-line; and, over-rising these, the high peaks. Each of these features has scores of stories and pictures. All four of them are seen at their best in some of the National Parks.

I. TIMBER-LINE

The most telling timber-line that I have seen is on the slope of Long's Peak in the Rocky Mountain National Park. This is a wild place during a winter gale. It is a stirring place at all times and seasons. One day I went up to timber-line on Long's Peak with a number of children. They were interested, and even excited, by the dwarfed

and strangely shaped trees. We found a dead pine that had lived two hundred and fifty-eight years, yet it was so small that a boy easily carried it about on his shoulder. Several little girls stood by a living spruce. Every child was taller than the little tree, yet the spruce had been growing when each of their great-grandmothers was born. All timber-line trees are undersized. Most of their ranks are less than eight feet high.

One autumn a grizzly that I was following dug up a number of dwarfed trees at timber-line. I carried these home for careful examination. One of them was a black birch with a trunk nine tenths of an inch in diameter, a height of fifteen inches, and a limb-spread of twenty-two inches. It had thirty-four annual rings. Another was truly a veteran pine, though his trunk was but six tenths of an inch in diameter, his height twenty-three inches, and his limb-spread thirty-one inches. His age was sixty-seven years. A midget that I carried home in my vest pocket was two inches

high, had a limb-spread of about four inches, and was twenty-eight years of age.

Timber-line is one of Nature's most interesting regions. Its location and also its marked characteristics are determined by climatic conditions — by cold, snow, wind, moisture, and drought. Wind is a most influential factor. The position of thousands of miles of timber-line is determined by it. At timber-line the Storm King says, "Thus far and no farther." The trees do not heed, but persistently try to go on, and the struggle for existence becomes deadly. They appear like our unfortunate brothers whom fate has chained in the slums. The trees try to stand erect and climb onward and upward, but in vain. The elements are relentless. The wind blows off their arms and cuts them with flying sand. The cold dwarfs them, and for nine months in the year the snow tries to twist and crush the life out of them. Some become hunchbacks; others are broken, bent, and half-flayed; while a few crouch behind the rocks. Many

stretches of timber-line are so battered by the wind that the trees have the appearance of having been recently swept by a cyclone, or overthrown by a giant roller.

What a weird scene! Here for ages has been the line of battle between the woods and the weather. At most timber-lines the high winds blow chiefly from one direction. Many of the trees possess a long, vertical fringe of limbs to leeward, being limbless and barkless to stormward. Each might serve as an impressive symbolic statue of a wind-storm. Permanently, their limbs stream to leeward together, with fixed bends and distortions, as if cast in metal at the height of a storm. Many present an unconquerable and conscious appearance, like tattered pennants or torn, triumphant battle-flags of the victorious forest! Some trees are several inches in diameter and only a few inches in height; others are creeping away from the direction of the storms, retreating from life's awful battle. All beauty and nobleness of appear-

ance are lost. But the trees have done their best.

Timber-line is not stationary. In most places it is advancing, climbing the heights. This advance is confined mainly to moist territory. In a few dry places the ranks are losing ground — are being driven back down the slopes; but these advances and retreats are extremely slow.

The altitude of timber-line varies with locality. On Mount Orizaba, in Mexico, it is a little over thirteen thousand feet; in the San Juan Mountains, in Colorado, a little above twelve thousand; in the Sierras and the Rockies, between eleven thousand and thirteen thousand; in the Cascades and the Alps, about sixty-five hundred feet; on Mount Washington, at forty-five hundred feet. It is lower with increased distance from the Equator, and at last is only a stone's throw above sea-level, finally showing its line in the lowlands of the Farthest North. Among the trees that maintain the front ranks at timber-line are

pines, spruces, firs, aspens, birches, and willows.

Many beautiful flowers are found at timber-line, along with bees, butterflies, birds, chipmunks, and foxes. Timber-line is a strangely interesting, arousing place. As I have said in "The Rocky Mountain Wonderland": —

> The powerful impressions received at timber-line lead many visitors to return for a better acquaintance, and from each visit the visitor goes away more deeply impressed; for timber-line is not only novel and strange, it is touched with pathos and poetry and has a life-story that is heroic. Its scenes are among the most primeval, interesting, and thought-compelling to be found upon the globe.

2. ABOVE THE TIMBER-LINE

The treeless moorlands and the crags that fill the sky above the limits of tree-growth form an extensive mountain-top world all by itself, a realm of plateaus and sky prairies, which only a few have explored. These regions stand out like is-

lands in the sky; they are singular treeless expanses above the surrounding forest sea.

This realm is not barren and lifeless. For a number of species it is home. The ptarmigan and the rose finch, the cony and the bighorn, live in the heights the year round. Many migrating birds and animals use the region for a nursery and a summer resort. Here, early in the autumn, Nature produces her last berries. Here assemble birds from the lowlands, and flocks from the North stop to feed and frolic while migrating to the Southland.

Here, too, along with peaks and moorlands, meadows and wild-flower gardens, are crags, plateaus, cañons, lakes, glaciers, and snow-fields. Countless small, clear streams originate in these island heights and from them start merrily down to the far-off seas. Singly and in clusters, with areas large and areas small, these sky islands are a feature of most of the National Parks.

ABOVE THE TIMBER-LINE IN THE ROCKY MOUNTAIN NATIONAL PARK
Long's Peak on extreme left

In the Rocky Mountain National Park a few flowers bloom on the highest peaks more than fourteen thousand feet above sea-level. They are visited by numerous winged insects, even by butterflies. Let a cloud come over the sun, or a breeze start, and the butterflies, and perhaps other winged insects above timber-line, fold wings and drop and remain motionless till the sky clears. Evidently this is "safety first" from the short-lived but violent gales.

It is believed that the Arctic-alpine plants in these heights were brought to them from the Arctic region on the great ice flow. They bloom in both these zones at about the same date. Among the bright blossoms in the polar mountain-top gardens are the columbine, gentian, aster, daisy, shooting-star, bluebell, a few kinds of phlox, and that dearest of the heath blossoms, the cassiope. Numbers are dwarfed to unbelievable smallness. Think of bluebells perfectly formed and colored and yet so fascinatingly small and dainty that a

half-dozen could be sheltered in the upper half of a thimble!

The alpine wild-flower garden on Mount Rainier is one of the most striking on the globe. Just above the timber-line and below and among the glaciers, colored flowers grow in tall and crowded luxuriance. They color broken distances for miles. It is doubtful if the world can show another hanging garden in which wild flowers so splendidly mingle their lovely hues with the broken picturesque forests, wild crags, and the grandeur of glaciers.

In the Rocky Mountain National Park there is an accessible empire in the mountainous sky, up more than two miles above the wide plains of the sea. Mountain-climbers pass through these scenes on their way up peaks into the sky without stopping to see the wonders. They have at best only an introduction, or a hurried traveler's impression, of a strange and varied exhibit.

A few centuries ago it was a common belief that high mountains were peopled

with monsters and demons. Those demons are gone from the popular imagination; but there still exists a most unfortunate superstition, commonly believed, that altitude is harmful! Yet it has a thousand benefits for the visitor.

In the heights dwell a bigness, a strangeness, a friendliness not felt in the earth's lower scenes. Altitude is ever refreshing. The dust-filled, noise-crowded air is far below. From these scenic mountain heights one commands a new world of mountainous cloud-scenery in the sky. Grand, deep, blue gorges lie open in the cloud plateaus and mountains. To the enraptured eye the shifting clouds sometimes become continents and islands, real lands where people live, landscapes upon whose sunny hills and forested mountains shadows of other clouds fall, and across whose expanding plains many winding rivers run. Often the largeness of view enables one to see vast cloud-pieces moved into place, shifted elsewhere, and others arranged. Often a num-

ber of these movements are seen at once. Here, too, the sunrise comes grandly before one, and from these mountain-rims the painted sky of evening is most intense and vivid. Cloud and color often mingle in paintings of undreamed vastness and glory.

Up here one appreciates the solemnity and the splendor of the moonlight. The lonely silver moon appears a wandering planet, almost within hailing distance. You call, and a hundred cliffs call with you. You listen, but there is only the murmur of a far-off waterfall, or the receding, echoing crash of some falling cliff. Everything is in half-tone. The chasm is concealed; peaks along the sky-line are suggested; the valleys lie in subdued and mellow light; strangely, from the silken shadow folds, the pinnacles peer at the moon. Through the clean, clear air, the infinite sky becomes a near, inverted field, crowded thick with stars.

This is a region worthy of multitudes of visitors, yet it has only a few. Most people

do not dream of its existence. Some time throngs will come to these strange island shores in the sky as freely as now they crowd to the beach and the breakers of the sea.

3. THE WORK OF THE ICE KING

With his glaciers the Ice King ground most of the soil in which now stand the forests, the grasses, and the flowers. In producing this soil he sculptured from the solid rock of the earth much of the scenery, shaped many of the flowing landscapes, and formed the excavations in which ten thousand lakes now rest in beauty. Long ice periods have had their sway, then vanished. Most of the earth appears to have been ice-covered a number of times. Then, after ages, the ice has returned. These periods appear to have alternated with others whose climatic conditions were similar to those now holding sway. The remaining glaciers, the world over, are growing smaller and smaller.

A glacier is a slow-moving mass of ice. It may be as small as an average steamship; it may be less than a mile wide and several miles long; or it may cover hundreds of square miles. It may be less than a hundred feet, or a thousand feet or more, in thickness. It may move only an inch or two a day, or it may move several feet. Commonly it moves downward, but occasionally one moves upward. The movement is due to gravity and to the plasticity or rubbery nature of the ice when under sufficient pressure or weight. In a large glacier the weight of the superimposed icy stratum is immense; it is greater than the bottom layers can support. Under the enormous pressure the bottom layers crawl or flow from beneath like pressed dough. This forced mass moves outward in the direction of the least resistance — commonly down the slope.

Glacier ice is formed by snow accumulating at a given point more rapidly than it melts. This is due chiefly to wind, snow-

slides, and heavy snowfall. The glacier, heavy and powerful, planes, polishes, and reshapes the surface over which it travels, or the walls with which it comes in contact. Most of the lake-basins were gouged out by glaciers. Mountain-ranges have been worn down to hills or plains; cañons and depressions have been filled, and extensive areas overlaid with ground-up rocky material. The gentle snowflake has been the earth's chief maker of scenery and soil. Snowflakes, working *en masse* and through long periods of time, have formed glaciers and as such have wrought wonders.

A moraine is an embankment or delta of boulders and crushed rock deposited by a glacier or ice river. Though commonly at the end, it may be both along the side and at the end of a glacier, or of the channels which the glacier once filled. All the mountainous National Parks have important glacial records or ruins that almost entirely cover them. These are moraines, soil-deposits, glaciated cañons, and lake-basins.

Vast is the quantity of material picked up and transported by glaciers. Mountains are moved piecemeal, and are ground to boulders, pebbles, and rock-flour in the moving. Besides the material the glacier gathers up and excavates, it carries the wreckage thrown down upon it by landslides, and also the eroded matter poured upon it by streams from the heights. Most of the material that falls upon the top of the upper end of the glacier gradually works its way to the bottom. At last, with the other gathered material, it is pressed against the bottom and sides and used as a cutting, rasping, or grinding tool till worn to pebbles or powder.

A part of the rocky material gathered is carried to the end of the glacier, where the melting of the ice unloads and releases it. This accumulation at the end is called the terminal moraine, and corresponds to the delta of a river. For years the bulk of the ice may melt away at about the same place; thus at this point accumulates an enor-

mous amount of débris. An advance of the ice may plow through this and repile it, or the retreat of the ice, or a changed direction of its flow, may pile débris elsewhere. Many of these terminal moraines are an array of broken embankments with small basin-like holes and smooth, level spaces.

Many of the lakes have been filled with sediment, and in them and on them forests now flourish. The glacier lakes were slowly created. Most of them are being slowly filled. Those most favorably situated may still live on for thousands of years, but an avalanche may extinguish one in a single day. Eventually all must be filled and lost. They come into existence as a part of the work of the glacier. For a period they lie beautiful in the sunlight; then they are gone forever.

The extensive glacial records that show the past triumphs of the Ice King sometimes make the mind restless, and it wants to know: "Will the Ice King come again? Will mountains of white and silent snow again pile upon a lifeless world?"

4. HIGH PEAKS

Those who go up into the clouds and sky on high mountains will find a variety of lofty and magnificent peaks in the National Parks. These peaks rise amid and above wildernesses of superb scenes, splendid combinations of peaks, streams, lakes, passes, forests, and moorlands.

My three favorite peaks in the United States are Mount Rainier, Long's Peak, and the Grand Teton, which is near Jackson's Hole, Wyoming.

In many respects Mount Rainier is the noblest mountain in the world. It is high, and to reach its summit is to make a journey that requires preparation and care. Much ice work is necessary in order to attain the top. Once there, the climber looks down upon extensive landscapes of forests and sea, islands and rivers, and snowy peaks.

Long's Peak is a rugged, vast monolith of granite 14,255 feet high. Usually it is al-

most entirely free of both ice and snow. It is a rock climb. It stands not in but immediately in front of the Continental Divide, whose near-by ruggedness is tremendously impressive. Far away one looks out over seas of mountains and on ocean plains. Standing side by side with Long's Peak, and of almost equal height, is Mount Meeker, also a rock climb that reveals scenes of unusual interest.

The Yellowstone has three excellent mountain-top view-points: Mount Washburn, Mount Sheridan, and Electric Peak. One can motor to the top of Mount Washburn, and the climbs to the tops of the other two are not extremely difficult.

In the Yosemite, Mount Hoffman, not the highest peak, but centrally located, commands the extraordinary scenes of the Park. Of the higher peaks, Mount Lyell is an excellent example.

It is probable that Mount Whitney will become a part of the Sequoia National Park. It is comparatively easy of ascent

and commands great views of the higher peaks of the Sierra. It is the highest peak within the bounds of the Union, being 14,501 feet high.

Among a wilderness of rugged mountains and lakes of the Glacier National Park are scores of peaks well worthy of the climber. To me Going-to-the-Sun Mountain and Mount Cleveland are two of the better ones.

Exercising in the heights quickly disinfects and reënergizes the system. A mental uplift, a broadening of the view, and a general lasting exhilaration come from the effort of mountain-climbing, together with the intimate human association and the soul-stirring scenes which it brings. Climbing a worthy peak ought to be listed among the proudest of our yearly accomplishments.

In "The Canoe and the Saddle" Theodore Winthrop thus translates the good tidings of the mountains: —

Exaltation such as the presence of the sublime and solemn heights arouses, we dwellers

eastward cannot have as an abiding influence. Other things we may have, for Nature will not let herself anywhere be scorned; but only mountains, and chiefest the giants of snow, can teach whatever lessons there may be in vaster distances and deeper depths of palpable ether, in lonely grandeur without desolation, and in the illimitable, bounded within an outline. Therefore, needing all these emotions at their maximum, we were compelled to make pilgrimages back to the mountains. . . .

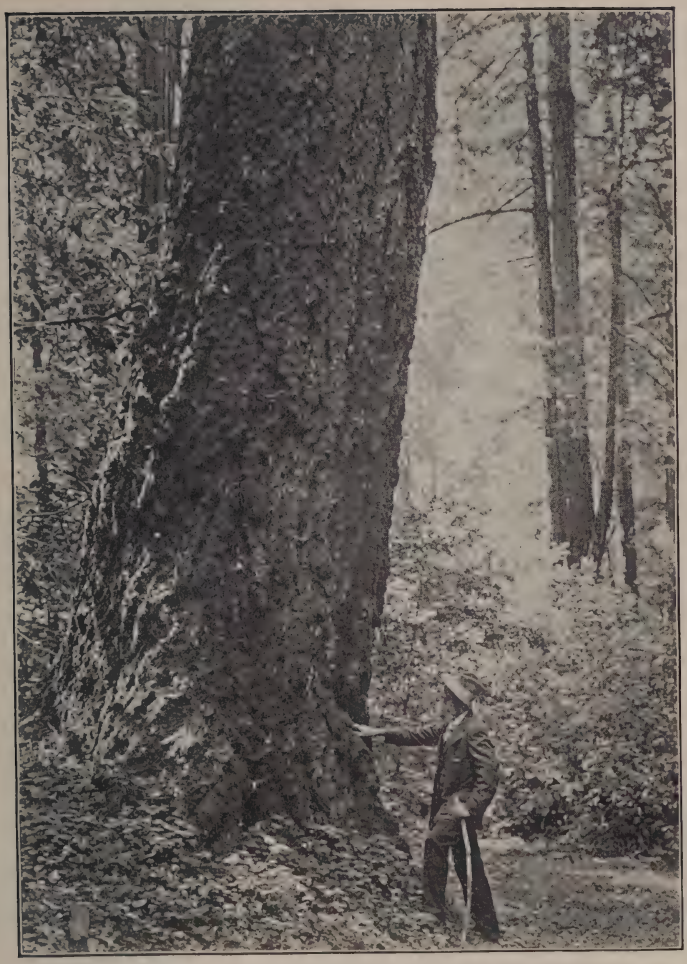
Mountains have been waiting, even in ancient worlds, for cycles, while mankind looked upon them as high, cold, dreary, crushing — as resorts for demons and homes of desolating storms. It is only lately, in the development of men's comprehension of nature, that mountains have been recognized as our noblest friends, our most exalting and inspiring comrades, our grandest emblems of divine power and divine peace.

XX

JOHN MUIR

JOHN MUIR arrived in San Francisco by boat from Panama in 1868. He was thirty years old. This was in the days of adventure. San Francisco Bay was alive with strange ships from every part of the globe. The city was filled with adventurers. On every hand were heard exciting tales of colonization and wealth in South America, Siberia, and Australia, stories of fabulous fortunes made in the islands of the South Seas, and rumors of rich strikes by the "Bonanza Kings" in the mines of Nevada. These things did not interest Muir. He became the Nestor of National Parks.

The second day after reaching San Francisco, he wandered away alone into the wilderness. He heard Nature's bugle-call and was led on and on. He wandered far



JOHN MUIR AT THE FOOT OF A DOUGLAS SPRUCE IN MUIR WOODS

into the flower-filled distances, threaded the forests, and climbed the heights where wild cataracts leaped and where the glaciers had left their story.

For forty years he spent the most of his time camping and exploring and studying in the wilderness along the Pacific Coast, chiefly in the Sierra of California. He neither fished nor carried a gun. He frequently went hungry; many times was without bedding; often he was entirely alone for weeks. These were glorious years!

He rambled through parts of Nevada, Oregon, Washington, and British Columbia, and made five trips to Alaska. He also made visits to Australia, India, Switzerland, Sweden, South America, and Africa. Long and intimately he associated with Nature in the Yosemite National Park.

He married in 1879, and for ten years devoted a part of his time to business, amassing a fair fortune. But in each of these years he managed to have several weeks in the wilderness.

He had a large share in arousing the public interest that led to the creation of forest reserves. For years he splendidly led the movement for National Parks. His work and his writing glorified the scenic outdoors.

In his Autobiography he says, "When I was a boy in Scotland I was fond of everything that was wild, and all my life I've been growing fonder and fonder of wild places and wild creatures." In his boyhood Wisconsin home he was so enraptured with Nature that, as he says, he could hardly believe his senses except when he was hungry or his father was thrashing him.

In another case he says, "Every wild lesson a love lesson; not whipped into us but charmed into us." Commenting on leaving college, he declares, "I was only leaving one university for another, the Wisconsin University for the University of the Wilderness." Stevenson wrote, "There should be nothing so much a man's business as his amusements." John Muir's

amusements occupied the major part of his life, and the result is an inspiring and ennobling influence on the world. More than anything else, his work is likely immeasurably to help the human race by getting us outdoors.

While ever enjoying the beauty of Nature, he was continually searching for facts. He had the poetic appreciation of Nature. He was the greatest genius that ever with words interpreted the outdoors. No one has ever written of Nature's realm with greater enthusiasm or charm. He once said, "In drying plants, botanists often dry themselves." He also felt that "dry words and dry facts will not fire hearts." Much that he wrote is prose poetry or is enlivened with the poetic fire of his genius.

His writings contain a wealth of National Parks material, and I wish that every child might know of them. His books are: "The Mountains of California," "Our National Parks," "Stickeen," "My First Summer in the Sierra," "The Yosemite,"

"The Story of my Boyhood and Youth," "Travels in Alaska," and "A Thousand-Mile Walk to the Gulf."

In December, 1914, the grandest character in National Parks history and in nature literature vanished into that mysterious realm into which all trails inevitably lead. He had rendered mankind a vast and heroic service. His triumphs were of the very greatest. They were made in times of peace for the eternal cause of peace. We are yet too close to the deeds of this magnificent man to comprehend their helpfulness to humanity. His practical labors and his books are likely to prove the most influential force in this century for the profitable use of leisure hours.

He has written the great drama of the outdoors. On Nature's scenic stage he gave the wild life local habitation and character — did with the wild folk what Shakespeare did with man. He puts the woods in story, and in his story you are in the wilderness. His prose poems illuminate the forest, the

storm, and all the fields of life. He has set Pan's melody to words. He sings of sun-tipped peaks and gloomy cañons, flowery fields and wooded wilds. He has immortalized the Big Trees. His memory is destined to be ever associated with the silent places, with the bird-songs, with wild flowers, with the great glaciers, with snowy peaks, with dark forests, with white cascades that leap in glory, with sunlight and shadow, with the splendid National Parks, and with every song that Nature sings in the wild gardens of the world.

XXI

NATIONAL PARKS THE SCHOOL OF NATURE

WHY not each year send thousands of school-children through the National Parks? Mother Nature is the teacher of teachers, these Parks the greatest of schools and playgrounds. No other school is likely so to inspire children, so to give them vision and fire their imagination. Surely the children ought to have this extraordinary opportunity.

The percentage of children aroused and started to greatness by schools of prison-like policy is small indeed. The proper place for at least a part of every child's schooling is the great outdoors. In our great National Parks we have an unrivaled outdoor school that is always open; in it is a library, a museum, a zoölogical garden, and a type of the wilderness frontier. In this

school-children are brought into contact with actual things, and become personally acquainted with useful facts, instead of merely reading about them. No better surroundings can be devised for developing common sense.

Learning under such conditions is delightful, yet it is discipline — a discipline that develops, not mere drudgery that discourages. Education cannot be separated from enjoyment. "Let us live for our children," said Froebel, the early exponent of the school of Nature. It is doubtful if we could do more for our young folk, for the nation, and for humanity than to have ample National Parks and opportunities for the children to enjoy them.

If each boy or girl — or any traveler — were to follow a particular line of nature-study during vacations, and give most of his time to one species of tree, flower, bird, or to the characteristic scenic feature of the region visited, each would return with a new and pleasant resource, and would have

something definite and worth while to report to his friends.

One of the greatest inheritances of each individual is imagination. The child instinctively believes in fairies. Unfortunately, the imagination too often is stifled and extinguished in childhood. It is imagination that "bodies forth the forms of things unknown," and makes all objects interesting. It lights the path of education and throws changing color and romance over every act and scene in life. It gives a magic spell to existence. This matchless torch may be set blazing by a visit to the wonderland of a National Park where wilderness is king — where the fairies live.

Often, the chief incentive that starts a child toward the acquiring of an education is interest in this fairyland of Nature. Interest is the highroad to education. Interest the mind and it will grow like a garden. The National Parks have, through this fact, an educational value which entitles them to be ranked among the strong-

est potential forces of our pedagogical system.

I have never known any one who had enjoyed the pleasure that comes from even a little knowledge of natural history to sink into the empty-headed pastime of trying to see crude forms in Nature's story-book. Usually, an individual given to this, when on an outing, is a bore to his companions. I simply cannot understand how people find pleasure in trying to discover animal forms, or various zoölogical figures, in the geological formations of the mountains, while the beholders are in the midst of a thousand objects of real interest. Such an exercise may be called humbug imagination.

Playing in the outdoors — especially when there is intimate association with birds and flowers, trees and waterfalls, mountains and storms — is one of the best ways of training the senses. The study of geology and glaciology, of the manners and customs of the beaver and the bear, gives

physical and mental and spiritual development of the best possible kind. The outdoors gives originality and individuality, and develops that master quality called the creative faculty, with which usually are found associated courage and wholesome self-reliance.

Charles W. Eliot, President Emeritus of Harvard University, says:—

> The best part of all human knowledge has come by exact and studied observation made through the senses of sight, hearing, taste, smell, and touch. The most important part of education has always been the training of the senses through which that best part of knowledge comes. This training has two precious results in the individual besides the faculty of accurate observation — one the acquisition of some sort of skill, the other the habit of careful reflection and measured reasoning which results in precise statement and record.

The pioneer men and women, and the children of pioneers, had few books, but they were wide-awake people and made excellent neighbors. Scores of great men and women with character as well as intelli-

gence have known little of books, but they had the ability to think — they had individuality. They had courage and kindness.

Mother Nature is ever ready to train the growing child. By using our wonderful National Parks for schools, we may give the boys and girls of to-day even better nature training than the pioneers received from their environment. Huxley says, "Knowledge gained at second hand from books or hearsay is infinitely inferior in quality to knowledge gained at first hand by direct observation and experience with Nature."

Many of the noblest pages of history were made by grand men and women whom Nature inspired. A poet says that all grand and heroic deeds were conceived in the open air. A nation composed of park-using people is prepared for the emergencies of war and also for the finer achievements of peace. Park life will keep the nation young.

Some of our thoughtful people are saying, "Better playgrounds without schools

than schools without playgrounds." The Parks used as a part of the school system should develop, enrich, and equip with happy, helpful material the growing mind of man.

In "The Training of the Human Plant," Luther Burbank says:—

Any form of education which leaves one less able to meet every-day emergencies and occurrences is unbalanced and vicious, and will lead any people to destruction.

Every child should have mud pies, grasshoppers, waterbugs, tadpoles, frogs, mud-turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade in, water-lilies, woodchucks, bats, bees, butterflies, various animals to pet, hayfields, pine-cones, rocks to roll, sand, snakes, huckleberries, and hornets; and any child who has been deprived of these has been deprived of the best part of his education.

By being well acquainted with all these they come into most intimate harmony with nature, whose lessons are, of course, natural and wholesome.

A fragrant beehive or a plump, healthy hornet's nest in good running order often become object lessons of some importance. The

inhabitants can give the child pointed lessons in punctuation, as well as caution and some of the limitations as well as the grand possibilities of life; and by even a brief experience with a good patch of healthy nettles, the same lesson will be still further impressed upon them. And thus by each new experience with homely natural objects the child learns self-respect and also to respect the objects and forces which must be met.

The wild gardens of Nature are the best kindergartens. The child who breathes the pure air among the pines, and plays among the birds and flowers, has the greatest of advantages. The child stirred with ideal hopes to-day will create nobly to-morrow. Children from Nature's Book and School stand highest in the examinations of life and carry life's richest treasures: health, individuality, sincerity, wholesome self-reliance, and efficiency. Touched with nature, they are natural and, like Tiny Tim, they love everybody. Nature wins the heart of childhood. Children playing and dreaming in outdoor fairylands make one of

the sweetest, dearest stories lived or learned on Nature's loving breast.

One of the best lessons gained from the wholesome atmosphere of the Parks is the duty of preserving natural beauties. We need Parks to prevent the extermination of our friends the wild flowers. A few years ago the following simple appeal for the wild flowers was written for me by Maud Gardner Odel: —

What will you with our bodies,
  Rude Ravishers of flowers,
Despoiler of our loveliness
  To please your idle hours?
The life you pluck so gayly
  Will perish in a day;
The form you praise so lightly,
  Turn swiftly to decay;
But leave us on our hillside
  With wind and bird and bee,
Insure us our inheritance
  Of immortality, —
Your sons shall know our fragrance,
  Your daughters feel our charm.
Oh, Friend of Future Ages,
  Do not the Wild Flowers harm!
    Columbine,
    Gentian,
    Iris, and Others.

Photographs made in National Parks could be used in homes, schools, hotels, etc.; they might well displace many of the pictures now in use. These photographs should embrace the grander scenes and the lovelier landscapes. Among the subjects handled would be the Big Trees, Yellowstone Falls, Yosemite Falls, the Grand Cañon, wild flowers and glaciers on Mount Rainier, the lakes in Glacier National Park, timber-line in the Rocky Mountain National Park, Crater Lake, and the ruins in the Mesa Verde. Among the animals pictured would be the grizzly bear, the mountain sheep, the mountain goat, the antelope, and the beaver; among the birds, the water-ouzel, the solitaire, the cañon wren, the eagle, the hummingbird, and the ptarmigan.

We need to know our country. Purposeful travel is educational. Our National Parks should stimulate travel, and a trip to them is an educational advantage to any one making it. One can hardly be

especially interested in any single feature of these Parks without also becoming acquainted with others.

Each year every city should honor itself by sending a number of individuals to study one or more of these Parks. Each school should send its brightest pupil; chambers of commerce might send representatives; women's clubs, D.A.R. organizations, and even the Y.M.C.A. and Y.W.C.A. might well be represented in such a delegation. This custom would give us nation-wide knowledge and sympathy.

It appears impossible to exaggerate the importance of knowing our wilderness lands — the frontier of yesterday.

During all the years — the long centuries between cave and cottage — our good ancestors ever traveled among Nature's inspiring pictured scenes. With interest and with awe they watched the silent movements of the clouds across the sky; they heard with speechless wonder the mysterious echo that lived and mimicked

in the viewless air; they puzzled over the strange, invisible wind that shook the excited trees and whispered in the rustling grass. They saw the wondrous sunrise; the light of day; the darkness; the fireflies in the forest; the lonely, changing moon. They heard the echoing crash of thunder. Lightning, — the branched golden river in the cloud mountains of the sky, — the clouds themselves, and the silken rainbow, were woven into beautiful myths. Thus, through changing seasons and the passing years, these splendid facts and fancies in Mother Nature's school fired the imagination with poetic wonder-tales and built the brain for our restless, triumphant race. The pathway to the Heroic Age lies out with Nature.

XXII

WHY WE NEED NATIONAL PARKS

THE Piute Indians have a legend which says that just at the close of creation the woman was consulted. She at once called into existence the birds, the flowers, and the trees. That is the kind of a woman with whom to start a world. We still need park places full of hope and beauty, with birds, flowers, and trees, that with their help we may live long and happily and harmoniously upon a beautiful world.

Scenic parts of this poetic and primeval world—parts rich in loveliness and grandeur—are saved for us in our National Parks. The National Parks and Monuments are filled with Nature's masterpieces, and contain splendid scenic and scientific features not elsewhere to be seen. The traveler might spend a lifetime in them without exhausting even their best attractions.

Why we Need National Parks

A National Park is an island of safety in this riotous world. Splendid forests, the waterfalls that leap in glory, the wild flowers that charm and illuminate the earth, the wild sheep of the sky-line crags, and the beauty of the birds, all have places of refuge which parks provide.

A National Park is a fountain of life. It is a matchless potential factor for good in national life. It holds within its magic realm benefits that are health-giving, educational, economic; that further efficiency and ethical relations, and are inspirational. Every one needs to play, and to play out of doors. Without parks and outdoor life all that is best in civilization will be smothered. To save ourselves, to prevent our perishing, to enable us to live at our best and happiest, parks are necessary. Within National Parks is room — glorious room — room in which to find ourselves, in which to think and hope, to dream and plan, to rest and resolve.

Nature, like our best friends, will have

us do our best. King Lear led the typical purposeless indoor life. He was surrounded with pomp and senseless ceremony. He was in the midst of enemies of sincerity and individuality. He decayed. He was turned outdoors. Across the stormy moor he wandered, followed by his faithful Fool. At the door of the hovel he hesitated. Urged by the Fool, he agreed to take shelter inside. In a brief time with Nature on the moor he had become acquainted with himself and had developed universal sympathy. Standing in the storm at the entrance to the hovel, he uttered this noble cry of compassion: —

"Poor naked wretches, wheresoe'er you are,
That bide the pelting of this pitiless storm,
How shall your houseless heads and unfed sides,
Your loop'd and window'd raggedness, defend you
From seasons such as these?"

National Parks provide climate for everybody and scenery for all. If we play in the scenes where fairies live, for us all will be right with the world. Parks give purpose, noble purpose, to life. They are

the "Never-Never-Land" in which we shall ever be growing, but never grow up.

The great peaks with age-old ice and snow, the mountain-high waterfalls that rush and roar, the waveless lakes that show the cloud and the blue, the waves of wind that shake the steadfast trees, the songs of birds that ring through the wilderness, the many-colored flowers and glorious sunsets — these waken and inspire us. We are glad to be living, and life's duties are done with happiest hands. We need these enchanted places. I am thankful to the pioneers who saw the wilderness scenes and were thoughtful enough to save the National Parks for us.

Robert Louis Stevenson says, "A man's most serious business is his amusements"; and some one else has said: —

We need more plain pleasures, for recreation rightly used is a resource for the common purposes of daily life that is entitled to rank with education, with art, with friendship. It is one of the means ordained for the promotion of health and cheerfulness and morality. Vice

must be fought by welfare, not restraint; and society is not safe until to-day's pleasures are stronger than its temptations. Amusement is stronger than vice and can strangle the lust of it. Not only does morality thus rest back on recreation, but so does efficiency. One half of efficiency and happiness depends upon vitality, and vitality depends largely upon recreation, especially the simple recreation of the open air.

How and where people play determines the character of individuals and the destiny of their country. Success in life-work depends upon play and relaxation. Blue Monday did not originate outdoors. It is doubtful if any other influence produces so many good habits as a park. Parks keep a nation hopeful and young.

The better and stronger nation of the future will be a park-using nation. Many wrecked nations have tried to get along without outdoor parks and recreation-places. It is but little less than folly to spend millions on forts and warships, on prisons and hospitals, instead of giving

people the opportunity to develop and rest in the sane outdoors.

The population of the United States now numbers a hundred millions and is growing with amazing rapidity. The harassing, exacting life of to-day makes outdoor life more important than ever before. Even in the country, more play places are needed. Most of the parklike places in the country have fallen into private hands to the exclusion of the public, but in every State in the Union a number of scenic places are available. These might well be secured by the public and made into city and county, state and national parks.

The intensity of love for native land depends chiefly upon the loveliness of its landscapes — upon its scenery. The great scenic places of a land should be owned by the public and often seen by the public. We cannot love an ugly country. Beauty satisfies the world's great longing. Hatred and prejudice may be taught, but the love of land must be inspired — and inspired

by the scenic loveliness of that land. "The beautiful is as useful as the useful." Some time a Secretary of Parks and Recreation may be the most honored member of the President's Cabinet.

Develop National Parks, and there is no danger that the people will fail to use them. They will help us to build a vast travel industry. In each of the years immediately preceding the European war, more than half a million Americans went to Europe. Each individual spent not less than a thousand dollars, a total of five hundred million dollars — this exclusive of large sums spent for works of art, jewelry, and clothing. Why should not such vast expenditures be made in our own country instead of in foreign lands? Scenery is an asset, and parks, multiplied and properly managed, would greatly help to keep our money at home as well as to educate and refine our people.

The existing National Parks — and there will be others — are a vast undeveloped resource of enormous potential value. They

are a golden field that will grow the more with reaping! The Parks have the power to change and better the habits of a nation. They may arouse in us the desire to spend most of our spare time, and lead to the fashion of holding most of our social gatherings, outdoors.

Lack of national unity is perilous. A nation divided against itself is not strong. Internal strife sometimes is worse than foreign war. The people of the United States are united in name, but are they doing good team-work? The mingling of people from all quarters in their own great National Parks means friendly union. The Westerner ought to know the Easterner; the Easterner should be acquainted with the Westerner, and he ought also to see the magnificent distances in the West. Travel to National Parks will promote such acquaintance in the happiest circumstances. Greatly it would help the general welfare of the nation if the citizens of the United States were better acquainted with their

own country, its resources, its people, and its problems. The debates on various public measures in Congress show a lack of national unity that arises from a lack of national information. A people united is a nation well prepared.

I sometimes think that getting really acquainted with some person, or with some fact, is a great event. There is nothing like acquaintance for promoting friendship, sympathy, and coöperation. To bring the capitalist and the laborer — all classes — together in the Park's august scenes, is bound to encourage acquaintance and to prevent misunderstandings. All this means unity, friendship, and will keep war drums in the background.

He who feels the spell of the wild, the rhythmic melody of falling water, the echoes among the crags, the bird-songs, the wind in the pines, and the endless beat of wave upon the shore, is in tune with the universe. And he will know what human brotherhood means; will understand the

heart of the democratic poet who declares, "A man's a man for a' that."

In Nature's ennobling and boundless scenes, the hateful boundary-lines and the forts and flags and prejudices of nations are forgotten. Nature is universal. She hoists no flags of hatred. Wood-notes wild contain no barbaric strains of war. The supreme triumph of parks is humanity. And as I have said elsewhere, some time it may be that an immortal pine will be the flag of a united and peaceful world.

John Muir felt that National Parks were the glory of the country and should make this country the glory of the earth. I feel certain that if Nature were to speak she would say, "Make National and State Parks of your best wild gardens, and with these I will develop greater men and women."

XXIII

THE TRAIL

National Parks will insure the perpetuation of the primitive and poetic pathway, the Trail.

The trail is as old as the hills. In every wild corner of the world it is the dim romantic highway through "No Man's Land." Ever intimate with the forest and stream, this adventurous and primitive way has an endless variety. Its scenes shift and its vistas change. It has the aroma of the wilderness. It always leads to a definite place over a crooked and alluring way. With eager haste it may go straight to some poetic point, but usually it winds with many a delightful delay. I think of it as watching the white cascades, listening to the echoes, delaying by the lonely shore, spending hours in the forest primeval, leisurely crossing the grassy, sun-filled glades, skirt-

TRAIL NEAR TIMBER-LINE, INDIAN HENRY'S PARK, MOUNT RAINIER

ing the time-stained crags and vanishing into the heights, looking down into the valley, and tarrying where artists would linger. Somewhere it leads to a lake.

At the primitive beaver house it takes a look as it crosses the expanded brook upon the beaver dam. A fallen tree gives it a way across the river. In a gorge it hears the ouzel from the rocks pour forth his melody — joyous notes of happy, liquid song.

It crosses a moraine to examine the useful débris that the Ice King formed while he was sculpturing the mountains and giving lines to the landscape. Clouds bound for definite ports in the trailless sky adorn its realm with floating shadows. It passes a picturesque old landmark, a pine of a thousand years. In this one spot the ancient pine has stood, an observing spectator, while the seasons and the centuries flowed along. His autobiography is rich in weather lore, full of adventures, and filled with thrilling escapes from fires, lightning, and landslides. During his thousand years,

strange travelers and processions have passed along. He often saw victor and victim and the endless drama of the wilderness.

The trail is followed by wild life, and along it the wild flowers fill the wild gardens. It has the spirit of the primal outdoors. It extends away ever to the golden age. Many a night this way across the earth is as thick with fireflies as the great Milky Way across the sky with stars. The moon, the white aspens, and the dark spruces pile it with romantic shades, and on a sunny day it is often touched by the fleeting shadow of an eagle in the sky.

This old acquaintance would have you carry your own pack, and, like your best friend, expects your best on every occasion. The trail compels you to know yourself and to be yourself, and puts you in harmony with the universe. It makes you glad to be living. It gives health, hope, and courage, and it extends that touch of nature which tends to make you kind. This heroic way

conducted our ancestors across the ages. It should be preserved. It has for us the inspiration of the ages.

A dim trail led our wandering primeval ancestors out from the twilight. It was a trail ever winding, shadowy, and broken, but ever under the open sky and ever from "yesterday's seven thousand years." It had its beginning in the walks of beasts that prowled the solemn primeval forests. Over it our half-lost ancestors painfully advanced. A fallen tree was their first bridge and a floating log their first boat. They wondered at the strange alternating day and night at which we still wonder. With joy they watched the shining dawn, and with fear and dread they saw the dusk of dying day. They learned the endless procession of seasons. The mysterious movements of wind and water aroused their curiosity, and with childlike interest they followed the soft and silent movements of the clouds. The wide and starry sky appealed strangely, strongly, to their imagi-

nation, and in this luminous field of space their fancy found a local habitation and a name for the thousand earthly fears and factors of their lives. They dared the prairie, climbed the hills, but long kept close to the forest.

After hard and fearful ages — after "a million years and a day" — the camp-fire came at last. This fragment of the Immortal Sun conquered the cold and the night, and misery and dread gave way to comfort and hope. No more the aspen trembled. It became a dancing youth, while the strange, invisible echo was a merry hiding child. The fireflies changed to fairies, and Pan commenced to pipe the elemental melody of the wild.

Nature ever showed her pictures and interested her children in fairylands. Winter, cold and leafless; spring, full of song and promise; the generous wealth of summer; and autumn with its harvest and color, came and disappeared, and came again through all the mysterious years. Light-

ning, the echo, with roar and whisper of the viewless air, the white and lonely moon, the strange eclipse, the brilliant and fleeting rainbow,—Nature's irised silken banner,—the mystery of death, these seeds of thought bloomed into the fanciful, beautiful myths and legends that we know.

Once, like a web of joy, trails overspread all the wild gardens of the earth. The long trail is gone, and most others are cut to pieces and ruined. The few broken remnants are but little used.

The traveler who forgets or loses the trail will lose his way, or miss the best of life. The trail is the directest approach to the fountain of life, and this immortal way delays age and commands youth to linger. While you delay along the trail, Father Time pauses to lean upon his scythe. The trail wanders away from the fever and the fret, and leads to where the Red Gods call. This wonderful way must not be buried and forgotten.

APPENDIX

APPENDIX

A

ACT OF DEDICATION OF THE YELLOWSTONE NATIONAL PARK

AN ACT TO SET APART A CERTAIN TRACT OF LAND LYING NEAR THE HEADWATERS OF THE YELLOWSTONE RIVER AS A PUBLIC PARK.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, — That the tract of land in the Territories of Montana and Wyoming lying near the headwaters of the Yellowstone River and described as follows, to-wit: Commencing at the junction of Gardiner's River with the Yellowstone River and running east to the meridian, passing ten miles to the eastward of the most eastern point of Yellowstone Lake; thence south along the said meridian to the parallel of latitude, passing ten miles south of the most southern point of Yellowstone Lake; thence west along said parallel to the meridian, passing fifteen miles west of the most western point of Madison Lake; thence north along said meridian to the latitude of the junction of the Yellowstone and Gardiner's Rivers; thence east to the place of beginning, is hereby reserved and drawn from settlement, occupancy, or sale

under the laws of the United States, and dedicated and set apart as a public park or pleasuring ground for the benefit and enjoyment of the people; and all persons who shall locate, or settle upon, or occupy the same or any part thereof, except as hereinafter provided, shall be considered trespassers and removed therefrom.

SEC. 2. That said public park shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be, as soon as practicable, to make and publish such rules and regulations as he may deem necessary or proper for the care and management of the same. Such regulations shall provide for the preservation from injury or spoliation of all timber, mineral deposits, natural curiosities or wonders within said park, and their retention in their natural condition.

The Secretary may, in his discretion, grant leases for building purposes, for terms not exceeding ten years, of small parcels of ground, at such places in said park as shall require the erection of buildings for the accommodation of visitors; all of the proceeds of said leases, and all other revenue that may be derived from any source connected with said park, to be expended under his direction in the management of the same and the construction of roads and bridle-paths, and shall provide against the wanton destruction of fish and game found within said park and against their capture or destruction for the purpose of merchandise or profit. He shall also cause all persons trespassing upon the same after the passage of this act to be removed therefrom, and generally shall be author-

ized to take all such measures as shall be necessary or proper to fully carry out the objects and purposes of this act.

Approved March 1, 1872.

Signed by:

JAMES G. BLAINE, *Speaker of the House.*

SCHUYLER COLFAX, *Vice-President of the United States and President of the Senate.*

ULYSSES S. GRANT, *President of the United States.*

B

THE NATIONAL PARKS AT A GLANCE

ARRANGED CHRONOLOGICALLY IN THE ORDER OF THEIR CREATION

(Number, 17; total area, 9776 square miles)

National Parks	*Location*	*Area in square miles*	*Distinctive characteristics*
Hot Springs (1832)....	Middle Arkansas	1½	46 hot springs possessing curative properties — Many hotels and boarding-houses — 20 bath-houses under public control.
Yellowstone (1872)....	North-western Wyoming	3348	More geysers than in all rest of world together — Boiling springs — Mud volcanoes — Petrified forests — Grand Cañon of the Yellowstone, remarkable for gorgeous coloring — Large lakes — Many large streams and waterfalls — Vast wilderness inhabited by deer, elk, bison, moose, antelope, bear, mountain sheep, beaver, etc., constituting greatest wild bird and animal preserve in world — Altitude 6000 to 11,000 feet — Exceptional trout-fishing.

National Parks	Location	Area in square miles	Distinctive characteristics
Yosemite (1890).....	Middle eastern California	1125	Valley of world-famed beauty — Lofty cliffs — Romantic vistas — Many waterfalls of extraordinary height — 3 groves of Big Trees — High Sierra — Large areas of snowy peaks — Water-wheel falls — Good trout-fishing.
Sequoia (1890).....	Middle eastern California	252	The Big Tree National Park — 12,000 sequoia trees over 10 feet in diameter, some 25 or 36 feet in diameter — Towering mountain-ranges — Startling precipices — Fine trout-fishing.
General Grant (1890)..	Middle eastern California	4	Created to preserve the celebrated General Grant Tree, 35 feet in diameter — 6 miles from Sequoia National Park and under same management.
Mount Rainier (1899).	West central Washington	324	Largest accessible single peak glacier-system — 28 glaciers, some of large size — 48 square miles of glacier, 50 to 500 feet thick — Wonderful sub-alpine wild-flower fields.
Crater Lake (1902)....	South-western Oregon	249	Lake of extraordinary blue in crater of extinct volcano, no inlet, no outlet — Sides 1000 feet high — Interesting lava-formations — Fine trout-fishing.
Mesa Verde (1906)....	South-western Colorado	77	Most notable and best preserved prehistoric cliff dwellings in United States, if not in the world.

National Parks	*Location*	*Area in square miles*	*Distinctive characteristics*
Platt (1906).....	Southern Oklahoma	1⅛	Many sulphur and other springs possessing medicinal value, under Government regulation.
Glacier (1910).....	Northwestern Montana	1534	Rugged mountain region—250 glacier-fed lakes—60 small glaciers—Peaks of unusual shape—Precipices thousands of feet deep—Fine trout-fishing.
Rocky Mountain (1915)	North middle Colorado	400	Heart of the Rockies—Snowy range, peaks 11,000 to 14,250 feet altitude—Remarkable records of glacial period.
Hawaii (1916).....	Hawaiian Islands	117	Vast volcanoes—Craters—Tropical plants and birds.
Lassen Volcanic (1916)	Northern California	123	Active volcano, volcanic records, lakes, hot springs, and forests.
Mount McKinley (1917)	Central Alaska	2200	"The Great One"; highest peak in North America, 20,300 feet; vast big-animal range; enormous glaciers; wild flowers.

Other National Parks are: —

Sully's Hill (1904) North Dakota.....Wooded hilly tract on Devil's Lake.
Wind Cave (1903) South Dakota.....Large natural cavern.
Casa Grande Ruin (1892) Arizona.....Prehistoric Indian ruin.

For National Park booklets and other Park information address The Director, National Park Service, Department of the Interior, Washington, D.C.

C

PROPOSED NATIONAL PARKS

Region	*Location*	*Characteristics*
Grand Cañon.....	Arizona	The Grand Cañon.
Mount Evans.....	Near Denver, Colorado	Magnificent peak, primeval forests, lakes, and alpine flora.
Mount Baker (the Indian Kulshan)	Northwestern Washington	Extinct or sleeping volcano; thirty square miles of glaciers, forests, and wild flowers.
Sawtooth Mountains.	Central Idaho	Precipitous mountains, alpine lakes, heavy forests, flowery meadows, clear streams.
Ozark Mountains....	Northern Arkansas	Rare river and mountain landscapes.
Mount McGregor....	Northeastern Iowa	Rare combination of river, hill, forest, bluff, and plains.
Pajarito Cliff Cities..	Pajarito Plateau, near Santa Fé, New Mexico.	Many vast prehistoric ruins of wonderful Indian civilization.
Mount Mitchell.....	Western North Carolina	Highest peak east of the Rockies, 6711 feet high; quiet scenery of the South Appalachians.
Pike's Peak.....	Central Colorado	The most frequently climbed 14,000-foot peak in the world; excellent view-point, rising abruptly from the plains.

Region	*Location*	*Characteristics*
Dunes.....	Northern Indiana	Lake Shore; extraordinary aggregation of plants from warm, cold, wet and dry zones.
San Juan.....	Southwestern Colorado	Magnificent mountains, individual in form and color, with large scene-commanding plateaus.
Grand Mesa.....	Western Colorado.	Lake-dotted plateau that towers near splendid horizons.
Bighorn Mountains..	Northern Wyoming	A towering, rocky, scenic alpine-island area in the sea of plains.
Niagara Falls.....	International Park between Canada, and New York near Buffalo	Stupendous waterfall; might well become an international park.
Mount Shasta.....	Northern California	Highest peak in northern California; alpine flowers; lava deposits; scenery.
Mount Hood.....	Northern Oregon, near Columbia River	Volcanic peak; icefields and forests.
Roosevelt Project....	Arizona	Enormous dam; vast reservoirs; desert areas; cactus park; historic ground.
Cañon de Chelly.....	Arizona	Towering monolithic rocks; high vertical colored cañons; cliff dwellings.
Sierra Madre	Near Los Angeles, California	Sierra Madre mountains; rare plant life; commands unusual scenes.

D

NATIONAL MONUMENTS

ADMINISTERED BY THE INTERIOR DEPARTMENT

Name	*Location*	*When created*	*Area (acres)*	*Description*
Devil's Tower.....	Wyoming	Sept. 24, 1906	1152	Remarkable natural rock tower, of volcanic origin, 1200 feet in height.
Montezuma Castle	Arizona	Dec. 8, 1906	160	Prehistoric cliff dwelling ruin of unusual size, situated in a niche in face of a vertical cliff; of scenic and ethnological interest.
El Morro.....	New Mexico	Dec. 8, 1906	160	Enormous sandstone rock eroded in form of a castle, upon which inscriptions have been placed by early Spanish explorers; contains cliff dweller ruins; of great historic, scenic, and ethnological interest.
Chaco Cañon.....	New Mexico	Mar. 11, 1907	20,629	Contains numerous cliff dweller ruins, including communal houses in good condition and but little excavated.

Name	*Location*	*When created*	*Area (acres)*	*Description*
Muir Woods.....	California	Jan. 9, 1908	295	Contains one of the most noted redwood groves in California; was donated by Hon. William Kent, Member of Congress; located seven miles from San Francisco.
Pinnacles.....	California	Jan. 16, 1908	2080	Contains many spirelike rock formations, 600 to 1000 feet high, which are visible for many miles; also numerous caves and other formations.
Tumacacori.....	Arizona	Sept. 15, 1908	10	Contains ruins of Franciscan mission dating from sixteenth century, until recent years in fair preservation, but now rapidly disintegrating.
Mukuntuweap....	Utah	July 31, 1909	15,840	Contains magnificent gorge, depth from 800 to 2000 feet, with precipitous walls and many waterfalls. Of great beauty and scenic interest.
Shoshone Cavern..	Wyoming	Sept. 21, 1909	210	Cavern of considerable extent, located near Cody.

Name	*Location*	*When created*	*Area (acres)*	*Description*
Natural Bridges...	Utah	Sept. 25, 1909	2740	Contains three natural bridges, among largest examples of their kind. Largest bridge is 222 feet high, 65 feet thick at top of arch; arch is 28 feet wide; span 261 feet; height of span 157 feet. Other two are only slightly smaller.
Gran Quivira.....	New Mexico	Nov. 1, 1909	160	One of the most important of earliest Spanish mission ruins in the Southwest. Monument also contains Pueblo ruins.
Sitka.....	Alaska	Mar. 23, 1910	57	Park of great natural beauty and historic interest as scene of massacre of Russians by Indians. Contains 16 totem poles of best native workmanship.
Rainbow Bridge...	Utah	May 30, 1910	160	Unique natural bridge of great scientific interest and symmetry. Height 309 feet above water; span is 278 feet, in shape of rainbow.

Name	*Location*	*When created*	*Area (acres)*	*Description*
Lewis and Clark Cavern.....	Montana	May 16, 1911	160	Immense limestone cavern of great scientific interest, magnificently decorated with stalactite formations. Cavern now closed to public because of depredations by vandals.
Colorado.....	Colorado	May 24, 1911	13,883	Contains many lofty monoliths and is wonderful example of erosion; of great scenic beauty and interest.
Petrified Forest.....	Arizona	July 31, 1911	25,625	Contains abundance of petrified coniferous trees, one of which forms a small natural bridge. Is of great scientific interest.
Navajo.....	Arizona	Mar. 14, 1912	360	Contains numerous pueblo or cliff dweller ruins, in good preservation.
Papago Saguaro...	Arizona	Jan. 31, 1914	2050	Contains splendid collection of characteristic desert flora and numerous pictographs. Interesting rock formations.
Dinosaur	Utah	Oct. 4, 1915	80	Contains deposits of fossil remains of prehistoric animal life of great scientific interest.

Name	*Location*	*When created*	*Area (acres)*	*Description*
Sieur de Monts....	Mount Desert Island, Maine	July 8, 1916	About 5000	Beautiful island scenery, mountains, lakes, meadows, numerous varieties of birds and plants. Historical Associations.
Capulin	Northeast Corner New Mexico	1916	681	Magnificent specimen of a volcanic cinder cone, 8000 feet high; crater 1500 feet in diameter, cone-shaped; numerous "blister cones."

ADMINISTERED BY THE DEPARTMENT OF AGRICULTURE

Name	*Location*	*When created*	*Area (acres)*	*Description*
Gila Cliff Dwellings	New Mexico	Nov. 16, 1907	160	Contains numerous cliff dweller ruins of much interest and in good preservation.
Tonto.....	Arizona	Dec. 19, 1907	640	Contains numerous cliff dweller ruins of much interest and in good preservation.

Name	*Location*	*When created*	*Area (acres)*	*Description*
Grand Cañon.....	Arizona	Jan. 11, 1908	806,400	Contains the most wonderful portion of the Grand Cañon of the Colorado.
Jewel Cave.....	South Dakota	Feb. 7, 1908	1280	Contains a limestone cavern of much beauty and considerable extent, limits of which are as yet unknown.
Wheeler.....	Colorado	Dec. 7, 1908	300	Of much interest from geological standpoint as example of eccentric erosion and extinct volcanic action. Of much scenic beauty.
Oregon Caves	Oregon	July 12, 1909	480	Extensive caves in limestone formation of much beauty. Magnitude not entirely ascertained.
Devil Postpile.....	California	July 6, 1911	800	Spectacular mass of hexagonal basaltic columns, like an immense pile of posts. Said to rank with famous Giant's Causeway, in Ireland.

Name	*Location*	*When created*	*Area (acres)*	*Description*
Mount Olympus...	Washington	Apr. 17, 1912	299,370	Contains many objects of great and unusual scientific interest, including many glaciers. Is summer range and breeding-ground of Olympic elk.
Walnut Cañon....	Arizona	Nov. 30, 1915	960	Contains cliff dwellings of much scientific and popular interest.
Bandelier.....	New Mexico	Feb. 11, 1916	18,000	Contains vast numbers of cliff dweller ruins, with artificial caves, stone sculpture and other relics of prehistoric life.

ADMINISTERED BY THE WAR DEPARTMENT [1]

Big Hole Battle-Field.....	Montana			
Cabrillo	California			

[1] "Lincoln National Park or Reservation" in Kentucky, Abraham Lincoln's birthplace, was established in 1916 and is administered by the War Department. It might well become a regular National Park.

E

DOMINION NATIONAL PARKS OF CANADA

(Number, 11; total area, 7945 square miles)

Name of park	*Location*	*Date of creation*	*Area in square miles*	*Distinctive characteristics*
Rocky Mountains Park.....	Alberta	1886	1800	Scenic park; Banff Hot Springs; Hoodoos; Lake Louise; Victoria and Lefroy Glaciers; Lakes in the Clouds; Mount Temple, 11,626 feet; Valley of the Ten Peaks; Mt. Assiniboine, 11,860 feet; Bow River Valley.
Yoho Park.....	British Columbia	1886	560	Yoho Valley; Lakes O'Hara and MacArthur; Takakkaw Falls; Twin Lakes; Emerald Lake; Natural Bridge; President Range and Glacier; Kickinghorse River, Ottertail Range and Valley; Fossil Beds.
Glacier Park.... .	British Columbia	1886	468	Mount Sir Donald and highest peaks of the Selkirks; great Illecillewaet and Asulkan Glaciers; Nakimu marble caves; Marion Lake, Rogers Pass.
Revelstoke Park..	British Columbia	1914	95	Mount Revelstoke; Clach-na-coodin Range and Ice-Field; Automobile Road building to summit of Mount Revelstoke; Lake Eva.

Name of park	*Location*	*Date of creation*	*Area in square miles*	*Distinctive characteristics*
Jasper Park.....	Alberta	1907	4400	Athabasca River and Valley; Yellowhead Pass; the oldest route across the Rockies; historic associations; Maligne Lake and Cañon; Fiddle Creek Cañon; Punchbowl Falls; Mount Robson, 13,036 feet, and highest peaks of the Canadian Rockies; Miette Hot Springs.
Waterton Lakes Park.....	Alberta	1895	423	Waterton Lakes; Cameron Falls, Bertha and Beaver Lakes; beautiful Wilson Range; exceptional fishing; great game preserve.
St. Lawrence Islands Park...	Ontario	1905	140 acres	Among the Thousand Islands of the St. Lawrence; especially for summer campers.
Fort Howe Park..	New Brunswick	1913	19 acres	Historic park; old fort; memorials of United Empire Loyalists, French régime, Lady Latour.
Buffalo Park ...	Alberta	1907	162	Animal park; home of the Canadian government buffalo herd, numbering over 2000 head.
Elk Island Park ..	Alberta	1899	16	Animal park; established for the protection of the elk, moose, deer; also herd of buffalo.
Maple Creek Antelope Reserve...	Saskatchewan	1914	19	Animal park; established for the preservation of the antelope.

BIBLIOGRAPHY

BIBLIOGRAPHY

National Park Publications issued by the Department of the Interior

(To be had from the Superintendent of Documents, Government Printing Office, Washington, D. C.)

Geological History of the Yellowstone National Park *Arnold Hague*
Geysers *Walter Harvey Weed*
Geological History of Crater Lake, Oregon *Joseph S. Diller*
Some Lakes of Glacier National Park *M. J. Elrod*
Sketch of Yosemite National Park and an account of the origin of the Yosemite and Hetch Hetchy Valleys *F. E. Matthes*
Origin of the Scenic Features of the Glacier National Park *Marius R. Campbell*
The Secret of the Big Trees *Ellsworth Huntington*
Glaciers of Glacier National Park *William C. Alden*
The Glacier National Park; A Popular Guide to its Geology and Scenery *Marius R. Campbell*
Excavation and Repair of Sun Temple, Mesa Verde National Park *J. Walter Fewkes*
Fossil Forests of the Yellowstone National Park *F. H. Knowlton*
Mount Rainier and its Glaciers *F. E. Matthes*
Forests of Mount Rainier National Park *G. F. Allen*

Features of the Flora of Mount Rainier National Park *J. B. Flett*
Forests of Yosemite, Sequoia and General Grant National Parks *C. L. Hill*
Forests of Crater Lake National Park *J. F. Pernot*

The National Park Service, Interior Department, is constantly issuing special publications that deal with particular phases of one or more National Parks. A bibliography may be had from the Department of the Interior giving a pretty complete list of all books, pamphlets, and magazine articles which contain information concerning any one or all National Parks. There are also a number of government publications which touch upon special phases of plant and animal life and geology. All issues of the *Sierra Club Bulletin*, *Mazama*, and *The Mountaineer*, contain more or less interesting matter that pertains to one or more National Parks.

Books Concerning Many National Parks

Nature and Science on the Pacific Coast

Wild Animals at Home *E. T. Seton*
Our National Parks *John Muir*
Western Wild Flowers *Margaret Armstrong*
Flora of Colorado *Rydberg*
Mountain Wild Flowers of America *Julia Henshaw*
Rocky Mountain Wild Flowers *Clements*
Handbook of Birds of Western United States *Florence Merriam Bailey*

Wild Animals at Home — *E. T. Seton*
The Mammals of Colorado — *Warren*
The Adventures of James C. Adams — *Hittel*
In Beaver World — *Mills*
Manual of the Trees of North America — *Sargent*
Field-Days in California — *Torrey*
Trees of California — *Jepson*
Three Wonderlands of the American West — *Thomas D. Murphy*

Books Concerning the Yellowstone National Park

The Yellowstone National Park — *Gen. H. M. Chittenden*
Catalogue of the Flora of Montana and the Yellowstone National Park. Memoirs of the New York Botanical Garden, vol. 1 — *Rydberg*
Our National Recreation Parks — *Nicholas Senn*
Southern California, Grand Canyon of the Colorado River, Yellowstone National Park. Lectures, vol. 10 — *John L. Stoddard*
U. S. Geological Survey, Monograph 32, part 2. Descriptive Geology Petrography, and Paleontology of the Yellowstone National Park.

Books Concerning the Rocky Mountain National Park

A Lady's Life in the Rocky Mountains — *Bird*
Wild Life on the Rockies — *Mills*
The Spell of the Rockies — *Mills*
In Beaver World — *Mills*
The Story of Estes Park — *Mills*
Rocky Mountain Wonderland — *Mills*

Bibliography

Books Concerning the Mesa Verde National Park

Cliff Dwellers of Mesa Verde — *G. Nordenskiöld*
The Land of the Cliff Dwellers — *Chapin*
Government publications:
Antiquities of Mesa Verde National Park, Bulletin Nos. 41 and 51, together with Excavations and Repair of Sun Temple.

Books Concerning the Glacier National Park

The Ascent of Chief Mountain, in *Hunting in Many Lands*, edited by Theodore Roosevelt and George B. Grinnell. — *Henry L. Stimson*
Blackfeet Tales of Glacier National Park — *Schultz*

Books Concerning Yosemite National Park

Indians of the Yosemite Valley — *Galen Clark*
In the Heart of the Sierras — *Hutchins*
Mountaineering in the Sierra Nevada — *Clarence King*
The Yosemite — *John Muir*
My First Summer in the Sierras — *John Muir*
Three Wonderlands of the American West — *Thomas D. Murphy*
A Yosemite Flora — *Hall*

Books Concerning Mount Rainier National Park

The Mountain that was God — *Williams*
Mount Rainier — *Meany*

Bibliography

Bibliography of the Dominion National Parks of Canada

Through the Heart of the Canadian Rockies
Frank Yeigh

Canada's West and Farther West *Frank Carrel*

The Fair Dominion *R. E. Vernede*

The New Garden of Canada *F. A. Talbot*

Among the Canadian Alps
Lawrence J. Burpee, F.R.G.S.

Climbs and Explorations in the Canadian Rockies
Norman Collie, F.R.S.

The Canadian Rockies *Prof. A. P. Coleman*

In the Heart of the Canadian Rockies
Sir James Outram

Among the Selkirk Glaciers *W. S. Green*

The Selkirk Range *A. O. Wheeler, F.R.G.S.*

The Selkirk Mountains; A Guide for Mountain Climbers *A. O. Wheeler, F.R.G.S.*

Published by the Dominion Parks Branch, Department of Interior, Ottawa

Glaciers of the Rockies and the Selkirks
Prof. A. P. Coleman, F.R.G.S.

Handbook to the Rocky Mountains Park Museum
Harlan I. Smith, Geological Survey, Ottawa

Geology of the Canadian National Parks
Charles Camsell, Geological Survey, Ottawa

Nakimu Caves

Fish and Their Habitat in the Rocky Mountains Park.

INDEX

Adams, James Capen, 301.
Altitude, not harmful, 331, 333, 349.
Altyn Lake, 149, 150.
Amethyst Mountain, petrified forests in, 45–50.
Andrews Glacier, 180, 187.
Anemone, Western, 124.
Antelope, 306.
Arapahoe Peak, 330.
Aspen, 290.
Asulkan Glacier, 412.
Athabasca River, 252.
Augusta Bridge, 237.
Avalanche Basin, 149.
Avalanche Lake, 149.

Ballou, Sidney, quoted, 228.
Bandelier National Monument, 411.
Banff, 254, 255.
Basket Dome, 69.
Bear, black, color and habits, 304; a bluffer, 304, 305.
Bear, grizzly, 341; a tame grizzly, 301, 302; characteristics, 302, 303; food, 303; hibernation, 304; color, 305.
Bears, disposition spoiled by improper feeding, 315.
Beaver, 307, 308.
Beaver Lake, Alberta, 413.
Bertha Lake, 413.
Bidwell, Gen. John, 110.
Bierstadt, Albert, 187.
Bierstadt Moraine, 187.
Big Hole Battlefield, 411.
Big Thompson River, 176.
Big Tree (*Sequoia gigantea*), 77, 78, 99, 100; size, 104, 105; groves, 104, 105; age, 105, 106; flowering and fruiting, 106; habit, 106, 107; bark, 107; roots, 107; durability, 107–09; the most impressive living object, 109; area not diminishing, 109; of ancient stock, 110; discovery, 110; habitat, 110, 111; its effect on persons, 112–15; thoughts suggested by, 286.
Big Tuolumne Cañon, 93.
Bighorn. *See* Sheep, mountain.
Bighorn Mountains, 404.
Birds, of Rocky Mountain National Park, 183, 184; of the Grand Cañon, 197; of the Olympic Mountains, 234, 235; of the National Parks, 309–14; mountain migration, 309, 310; mating for life, 310, 311; appear to desire human society, 313, 314.
Bison, 243, 261.
Blackfeet Glacier, 151, 157.
Blackfeet Indians, 15, 17–21, 157–59.
Boling, Capt. John, 94.
Bow River Valley, 412.
Bowman Lake, 149.
Brackenridge, Henry M., 22.
Bradbury, John, 22, 23.
Brett, Col. L. M., 58.
Bridal Veil Falls, 68, 85.
Bridger, James, 24.
Bright Angel Cañon, 193.
Bright Angel Point, 193.
Bryant, William, 21.
Bryce, James (Lord Bryce), 122.
Buckwheat, wild, 124.
Buffalo, 243, 261.
Buffalo Park, 261, 413.
Burbank, Luther, quoted, 372, 373.

Cabrillo National Monument, 411.
Cameron Falls, 413.
Camp-fire, the, 293, 294.
Canada, Dominion Parks of, description, 251–62; creation and administration, 262, 263.
Canoe and the Saddle, The, quoted, 120, 121, 128, 358, 359.
Cañon de Chelly, 404.

Cañon of the Little Colorado, 193.
Cape Royal, 193.
Capulin National Monument, 409.
Carbon Glacier, 133.
Caroline Bridge, 237.
Carter, T. H., 159, 160.
Casa Grande Ruin Reservation, description, 245, 246.
Cataract Cañon, 205.
Cathedral Lake, 92.
Cathedral Peak, 92.
Cathedral Spires, 68.
Chaco Cañon, 405.
Chasm Lake, 186.
Chittenden, Gen. Hiram M., 23, 37, 57; quoted, 8.
Chouteau, Pierre, 21.
Cinder Cone, 216–18.
Clach-na-coodin Range, 412.
Claggett, William H., 5, 6.
Clark, Galen, 78, 96–98, 105.
Clark, William, 21, 22.
Clements, W. M., 159.
Cleveland Mountain, 150.
Cliff Cañon, 173.
Cliff dwellers, of Mesa Verde, 163–74.
Clothing, for rainy days, 335.
Clouds' Rest, 68.
Cole, Cornelius, 6.
Colorado National Monument, 408.
Colorado River, and the Grand Cañon, 199–209.
Colter, John, 12–24.
Colter's Hell, 23.
Columbia's Crest, 135.
Continental Divide, 186, 187.
Cook, C. W., 25.
Cook Forest, 268.
Crater Lake, first impressions, 137, 138; origin, 138, 139; description, 140–45; discovery, 145, 146; trout-fishing, 146.
Crater Lake National Park, 137–47; founding, 146; location and area, 146; proposed additions, 147; in table, 401.
Cut Bank Pass, 158.
Cut Bank River, 156.

Dana Mountain, 65, 92.
Daniels, Mark, 278, 279.
Dawes, Henry L., 6.
Death Valley, 102.
Deer Mountain, 188.
Desert, The, by John C. Van Dyke, quoted, 209, 210.
Devil Postpile, 410.
Devil's Lake, 244, 245.
Devil's Tower, 405.
Diamond Lake, 147.
Diller, Joseph S., quoted, 142, 143, 219.
Dinosaur National Monument, 408.
Dipper, *or* water-ouzel, 313.
Doane, Lieut. Gustavus C., 25, 26.
Dock, white, 124.
Doty, James, 158.
Dunes, in Indiana, 268, 404.

Eagle Peak, Yosemite, 88.
Eagle Point, 137.
Echo Mountain, 180.
El Capitan, 68.
El Morro National Monument, 405.
El Tovar, 193.
Electric Peak, 357.
Electrical storm, 324–26.
Eliot, Charles W., 223; quoted, 370.
Elk, 53, 305, 306.
Elk, Roosevelt, 234.
Elk Island Park, 261, 413.
Emerald Lake, 257.
Emmons Glacier, 130, 131.
Erosion, in the Grand Cañon, 194, 198–206.
Estes Park, 176.
Eureka, Cal., 268.
Everts, Truman C., 58–64.

Fall River automobile road, 187.
Falls of the Yellowstone, 38, 41, 42.
Fern Lake, 187.
Fewkes, Dr. Jesse Walter, 171; quoted, 167, 168, 268.
Fiddle Creek Cañon, 253.
Field, B. C., 258.
Firehole, 30.
Fisher, Walter L., 279, 280.
Flat-Top Mountain, 180, 187.
Flowers, of Yellowstone Park, 52; of Yosemite Park, 79–83; of Mt. Rainier, 122–30, 348; of Rocky Mountain Park, 181, 182, 347; of

the Olympic Mts., 234; of Rocky Mountains Park, Canada, 256; of mountain-tops, 347, 348.
Folding Mountain, 253.
Folsom, David E., 25.
Forest, the, spirit of, 282–95. *See also* Trees.
Forest Cañon, 187.
Forest reservations, 272–76.
Forests, petrified, 45–50.
Fort Howe Park, 262, 413.
Fort Manuel, 14, 15, 16, 20.
Fort Totten, 244.
Fossils, 258, 412.
Franklin Pass, 101.
Fuller, Miss Fay, 121.
Fusillade Mountain, 155.

Gem Lake, 180, 188.
General Grant National Park, 99, 100, 105; in table, 401.
Geysers, of Yellowstone Park, 26, 28–35.
Ghost River, 255.
Giant Forest, 105.
Gibbs Mountain, 65.
Gila Cliff Dwellings, 409.
Glaciation, 351–55; in Yosemite Park, 70–76; in Sequoia Park, 102, 103; at Crater Lake, 141, 142; in Glacier National Park, 152.
Glacier Gorge, 186.
Glacier National Park, lakes, 148–50, 154, 155; mountains, 150, 151, 155, 156; glaciers, 151, 152, 155, 156; game, 152, 153; place-names, 153; wild flowers, 153; streams, 156, 157; history, 157–60; motor road to Waterton Lakes Park, 259; in table, 402.
Glacier Park, Canada, 412.
Glacier Point, Yosemite, 68, 88.
Glaciers, of Mt. Rainier, 117, 118, 130–34; of Glacier National Park, 151, 152, 155, 156; of Rocky Mountain Park, 180; of Mt. McKinley, 249; speed, 352; formation, 352, 353.
Glen Cañon, 191, 197.
Goat, mountain, 306, 307.
Going-to-the-Sun Mountain, 155, 358.
Gould Mountain, 150.
Gran Quivira, 407.
Grand Cañon National Monument, 410.
Grand Cañon of the Colorado, proposed National Park, 190, 191; first impressions, 191, 192; views, 192, 193; description, 193–95; formation, 194, 198–206; climate, 195, 196; plant life, 196, 197; animal life, 197; history, 206–08; books about, 209; a land of form and of color, 210.
Grand Cañon of the Yellowstone, 38, 39, 41.
Grand Lake, 188.
Grand Mesa, 404.
Grand River, 188.
Grand Teton, 44, 266.
Grand View, 193.
Gray, Asa, quoted, 79.
Gray's Peak, 330.
Greeley, Horace, 112.
Grinnell, George Bird, and Yellowstone Park, 57; and Glacier Park, 157–60; quoted, 159, 160.
Grinnell Glacier, 150, 151.
Grinnell Lake, 150, 153.
Grinnell Mountain, 150.
Grizzly Giant, 77, 78, 104, 105.
Grosvenor, Gilbert H., quoted, 100, 101.

Hague's Peak, 179.
Haleakala, 222, 227, 228.
Half Dome, 68.
Hall, Harvey Monroe, and Carlotta Case Hall, *A Yosemite Flora*, quoted, 82, 83.
Hallet Glacier, 180, 188.
Harris, Capt. Moses, 57.
Hauser, Samuel T., 26.
Hawaii National Park, location and area, 221, 222; volcanoes, 221–29; forests and birds, 228, 229; views, 229; origin, 229; in table, 402.
Hayden, Dr. Ferdinand V., and the founding of Yellowstone Park, 5, 6; quoted, 29, 178, 179.
Hayden Valley, 51.
Heart Lake, 36.

Heather, 125.
Hedges, Cornelius, 4, 5, 26; quoted 26.
Hellebore, 124.
Hetch-Hetchy Valley, 66, 74, 86, 88; description, 89; history, 95, 96.
Hill, L. W., 160.
Hillman, John W., 146.
Hilo, 225.
Honolulu, 222.
Hopi Point, 193.
Hot Springs Reservation, description, 246, 247; in table 400.
Hunt, T. E., quoted, 240.
Hunting-contest, a, 297, 298.
Husted, S. N., 328.

Iceberg Lake, 149.
Illecillewaet Glacier, 412.
Illilouette Cañon, 69.
Illilouette Falls, 86.
Indian Henry's Hunting Grounds, 123.
Indians, and the Yellowstone region, 11, 12; Colter's adventures with, 15, 17–21; legend of Yosemite, 93, 94; in Glacier National Park, 157–59; tradition about Cinder Cone, 217; legend of woman, 378.
Indian-turnip, 20.
Irving, Washington, 23.
Ives, Lieut., quoted, 206.

Jagger, Thomas A., quoted, 227.
James, Gen. Thomas, 23.
Jamez Plateau, 267.
Jasper, Alberta, 253.
Jasper Park, description, 252, 253; in table, 413.
Jefferson River, 18–20.
Jepson, W. L., 106.
Jewel Cave, 410.
Johnson, Robert Underwood, 94.

Kachima Bridge, 237.
Kautz Glacier, 134.
Kaweah River, 102.
Kent, William, 219, 406.
Kern River Cañon, 101.
Kickinghorse River, 258.
Kilauea, 222–24.
King, Clarence, 71, 102; his *Mountaineering in the Sierra Nevada*, 103.
King's River Cañon, 101.
Kolb, Ellsworth L., 209.
Koloma, 89
Kulshan, 403.

La Charette, 23.
Laggan, 255.
Lake Bidwell, 217.
Lake Eva, 412.
Lake Louise, 256.
Lake MacArthur, 412.
Lake McDonald, 149.
Lake Minnewanka, 255.
Lake O'Hara, 412.
Lake Tenaya, 76.
Lakes, crater, 142.
Lakes in the Clouds, 412.
Lamar River, 46.
Lamon, John, 95.
Lamont, Alberta, 261.
Lane, Franklin K., 278.
Langford, Nathaniel P., 5, 6, 26, 56.
Lassen Peak, 211–16.
Lassen Volcanic National Park, location, area, and altitude, 211, 212; origin, 212, 219; description, 212–17; Indian tradition, 217; springs and streams, 217; lakes, 217, 218; trees, flowers, and animal life, 218, 219; attractions, 219, 220; in table, 402.
Lava, 38, 39, 139–41, 204, 205, 213, 214, 216, 218; a huge field of, 212, 213; in Hawaii National Park, 223–29.
Lava Falls, 204, 205.
Lefroy Glacier, 412.
Lewis, Judge Robert E., decision quoted, 277, 278.
Lewis and Clark Cavern, 408.
Lewis Lake, 36.
Liberty Cap, Mt. Rainier, 199.
Lily, Washington, 81.
Lincoln, Abraham, quoted, 112.
Lincoln National Park or Reservation, 411.
Lion, mountain, 309.
Lisa, Manuel, 13, 14.
Little Bridge, 237, 238.

Little Kootenai Creek, 156.
Little Yosemite Valley, 69, 73, 74.
Little Zion River Region, 239.
Loch Vale, 186.
Lodore Cañon, 205.
Logging Creek, 156.
Long's Peak, 178–81, 356, 357; above a snowstorm on, 318, 319; in a high wind, 320–22; moonlight and sunrise on, 328–31; timber-line on, 340, 341.
Los Molinos, 214.
Lost Creek, 214, 215.
Lost in the wilderness, 58–64, 337, 338.
Luray Caverns, 268.

McClurg, Mrs. Gilbert, 168.
McDermott Lake, 149.
McFarland, J. Horace, 276.
Maligne Lake, 253.
Mammoth Cave, 268.
Mammoth Hot Springs, 30, 31.
Maple Creek Antelope Reserve, 413.
Marble Cañon, 191, 205.
Marion Lake, 412.
Mariposa Grove, 77, 78.
Marshall, Robert B., 279.
Mather, Stephen T., 96, 278, 279.
Matthes, François E., 71; quoted, 120.
Mauna Loa, 222, 224–27.
Meadow Mountain, 179.
Menard, Pierre, 21.
Merced Grove, 77.
Merced River, 66, 67, 70.
Mertensia, 124.
Mesa Verde National Park, interest of, 161, 162; location, area, and altitude, 162; view from, 162; ancient inhabitants, 163–67; ruins, 167–74; establishment, 168; history, 169–71; in table, 401.
Miette Springs, 253.
Mills Moraine, 186.
Mineral King, 101.
Mirror Lake, 93.
Mono Desert, 92.
Mono Lake, 92.
Monroe, Hugh, 158.
Montezuma Castle, 405.
Moonlight, 326, 327; ascent of Long's Peak by, 328, 329.
Morning-Glory Spring, 30.
Mt. Adams, 235.
Mt. Assiniboine, 412.
Mt. Baker, 121, 403.
Mt. Cleveland, 358.
Mt. Cougar, 233.
Mt. Dana, 65, 92.
Mt. Evans, 403.
Mt. Everts, 63.
Mt. Gibbs, 65.
Mt. Haleakala, 222, 227, 228.
Mt. Hoffman, 88, 91, 357.
Mt. Hood, 404.
Mt. Jackson, 151, 155.
Mt. Lady Washington, 186.
Mt. Lyell, 65, 357.
Mt. McGregor, 403.
Mt. McKinley, 248–50.
Mount McKinley National Park, description, 248–50; in table, 402.
Mt. Mauna Loa, 222, 224–27.
Mt. Mazama, 137–42.
Mt. Meany, 233.
Mt. Meeker, 178, 179.
Mt. Mitchell, 403.
Mt. Olympus, 232.
Mount Olympus National Monument, description, 230–35; in table, 411.
Mt. Rainier, size and altitude, 116; a volcano, 117, 119; a source of inspiration, 120; discovery and exploration, 120–22; timber-line, 129; glaciers, 130–34; snowfall, 134, 135; streams and erosion, 135, 136; climbing, 356.
Mount Rainier National Park, area, 116; additions suggested, 117, 266; roads and trails, 117, 118; creation, 122; wild-flower garden, 122–30, 348; trees, 129, 130; animal life, 130; in table, 401. *See also* Mt. Rainier.
Mt. Revelstoke, 260.
Mt. Robson, 413.
Mt. St. Elias, 266.
Mt. St. Helens, 235.
Mt. Seattle, 233.
Mt. Shasta, 404.
Mt. Sheridan, 357.

Mt. Sir Donald, 412.
Mt. Stephen, 258.
Mt. Tahoma. *See* Mt. Rainier.
Mt. Temple, 412.
Mt. Thielson, 147.
Mt. Washburn, 357.
Mt. Watkins, 69.
Mt. Whitney, 100, 101, 357, 358.
Mountaineers Club, 232.
Mountains, higher regions of, 340–51; high peaks, 356–59.
Muir, John, 71, 87, 90, 103, 276, 313, 387; quoted, 42, 43, 50, 69, 70, 89, 97, 110, 127, 190, 362; his story of an Englishman at Yosemite, 94, 95; and the Hetch-Hetchy fight, 95; on the Big Tree, 108–10; sketch of, 360–65.
Muir National Park, proposed, 103.
Muir Woods, 406.
Mukuntuweap Cañon, 239–41.
Mukuntuweap National Monument, description, 239–41; in table, 406.
Muldrow Glacier, 249.
Mummy Lake, 174.
Mummy Range, 187.

Nakimu marble caves, 412.
National Academy of Science, 277.
National Monument, Mount Olympus, 230–35; Mukuntuweap, 239–41; Natural Bridges, 236–39; Rainbow Bridge, 236–39. *See also table and data*, 405–11.
National Monuments, administration, 280, 281; table of, 405–11.
National Park, Casa Grande Ruin, 245, 246, 402; Crater Lake, 137–47, 401; General Grant, 99, 100, 105, 401; Glacier, 148–60, 402; Hawaii, 221–29, 402; Hot Springs, 246, 247, 400; Lassen Volcanic, 211–20, 402; Mesa Verde, 161–74, 401; Mount McKinley, 248–50, 402; Mount Rainier, 116–36, 401; Platt, 248, 402; Rocky Mountain, 175–89, 402; Sequoia, 99–115, 401; Sully's Hill, 244, 245, 402; Wind Cave, 242–44, 402; Yellowstone, 3–62, 400; Yosemite, 65–98, 401.
National Park Mountain, 4.
National Parks, origin, 3, 4; needs, 264; advantages, 264, 265; new Parks proposed, 266–69; development needed, 269–72; as distinguished from National Forests, 272–77; importance of separate management, 277, 278; administrative history, 278–80; and the National Monuments, 280, 281; as wild-life sanctuaries, 296–316; physical, mental, and moral benefits from, 333, 334, 338; immortal, 339; educational value, 366–77; our need of, 378–87; table of, 400–02; table of proposed Parks, 403, 404.
Natural Bridge, Yoho Park, 257.
Natural Bridges National Monument, description, 236–39; in table, 407.
Navajo National Monument, 408.
Nevada Falls, 86.
Niagara Falls, 404.
Nisqually Glacier, 118, 131–33.
Nolen, John, 276; quoted, 276.
Nonnezoshie Bridge, 238.
Nordenskjöld, Baron, 169.
North Carolina, 268.
North Dome, 69.
North Specimen Mountain, 326.
Nyack River, 157.

Odel, Maud Gardner, poem, 374.
Odessa Lake, 187.
Olmsted, Frederic Law, quoted, 274, 275.
Olympic Mountains, 230–36.
Olympic National Monument. *See* Mount Olympus National Monument.
Olympic National Park, proposed, 230, 236.
Oregon Caves, 410.
Ottertail Range, 412.
Ottertail Valley, 412.
Owachomo Bridge, 237, 238.
Ozark Mountains, 403.

"Paint-Pots," in Yellowstone Park, 42.
Pajarito cliff cities, 403.

Papago Saguaro National Monument, 408.
Paradise Glacier, 133.
Paradise Park, 123, 131.
Parsons, Edward T., 90.
Parsons Memorial Lodge, 90–93.
Peak Success, 119.
Perdrix Mountain, 253.
Peterson, William, 25.
Petrified Forest National Monument, 408.
Phantom Ship, 145.
Pierre's Hole, 15.
Pike's Peak, 330, 403.
Pine, lodge-pole, 52.
Pine, sugar, 78.
Pine, yellow, 78, 79.
Pinnacles National Monument, 406.
Piute Indians, legend, 378.
Platt National Park, 248, 402.
Point Sublime, 193.
Pollock, W. C., 159.
Pomeroy, Samuel Clarke, 6.
Porcupine, 307.
Potts, John, 17.
Poudre Lakes, 325.
Powell, Major John W., 206.
President Range, 412.
Prismatic Lake, 30.
Ptarmigan, 311, 312.
Puget Sound, 235.
Punch-Bowl Falls, 253.
Pyramid Rock, 134.

Raeburn, D. L., 249.
Rainbow Bridge, 238.
Rainbow Bridge National Monument, description, 236–39; in table, 407.
Rainier, Peter, 120.
Rainstorm, joy in a, 323, 324.
Raker, John E., 219.
Red Eagle Mountain, 155.
Red Eagle River, 156.
Redwood Meadow, 101.
Reservation, Casa Grande Ruin, 245, 246, 402; Hot Springs, 246, 247, 400.
Revelstoke Park, description, 260; in table, 412.
Rhyolite, 38, 39, 140.
Ribbon Falls, 86.
Roche Miette, 253.
Rocky Mountain National Park, character, 175–77; area and altitude, 177; mountains, 178–80; glaciation, 180, 181; lakes, 180, 187, 188; wild flowers, 181, 182; animal life, 183, 184; trees, 184; timber-line, 184, 185; points of interest, 186–89; addition in 1917, 188 and note; a hunting-contest in, 297, 298; bighorn in, 307; flowers on highest peaks, 347; regions above timber-line in, 348; in table, 402.
Rocky Mountain Wonderland, The, quoted, 273, 345.
Rocky Mountains Park, Alberta, description, 254–56; in tables, 412.
Rogers Pass, 412.
Roosevelt Project, 404.
Royal Arches, 69.

St. Anthony, Idaho, 15.
St. John, N.B., 262.
St. Lawrence Islands Park, 261, 413.
St. Mary's Lake, 154, 155.
St. Vrain River, 323.
San Juan Mountains, 404.
Savage, Major James D., 94.
Sawtooth Mountains, 403.
Scenery, value of, 277, 278.
Schultz, James Willard, 157, 158.
Screech, Joseph, 95.
Selkirk Mountains, 412.
Sentinel Falls, 88.
Sentinel Rock, 68.
Sequoia. *See* Big Tree.
Sequoia National Park, area and topography, 99–103; the Big Trees of, 104–15, 282, 286; in table, 401.
Sheep, mountain, 188, 189, 306, 307; a case of tameness, 300.
Sheldon, Charles, 250.
Sherman, Mrs. John D., 276, 277.
Ship Rock, 162.
Shoshone Cavern, 406.
Shoshone Lake, 36.
Siberian Plateau, 101.
Sierra Club, 94.

Sierra Madre Mountains, 404.
Sierra Nevada. *See* Yosemite National Park *and* Sequoia National Park.
Sieur de Monts National Monument, 409.
Sipapu Bridge, 237.
Sitka National Monument, 407.
Smith, Miss Edna, quoted, 327–31.
Snag Lake, 214.
Snow, banners of, 322.
Snowpeak Avenue, 257.
Snow-plant, 81.
Snowstorm, climbing above a, 317–19.
Soda Springs, 90–93.
Solitaire, 291, 292, 311.
Specimen Mountain, 179, 188, 189.
Sperry Glacier, 151.
Sprague's Glacier, 180, 187.
Spray Park, 123.
Springs, hot, of Yellowstone Park, 28–32, 39; of Lassen Volcanic Park, 217, 219.
Steele, William G., 146.
Stevens, Gen. Hazard, 121.
Stevenson, Robert Louis, quoted, 362, 381, 382.
Stewart, George W., 100.
Stimpson, Harry L., 157.
Stone, Julius F., 207; quoted, 207–09
Stump Lake, 216, 218.
Sully's Hill, 245.
Sully's Hill National Park, description, 244, 245.
Sulphur Mountain, 254.
Summerland, 123.
Swift Current Pass, 154.
Sylvan Lake, 44.
Sylvan Pass, 44.

Tahoma, Indian name for Mt. Rainier, 120.
Tahoma Glaciers, 134.
Tahosa Valley, 186.
Takakkaw Fall, 257.
Tehipitee Dome, 102.
Tenaya Cañon, 69.
Teton Mountains, 44.
Thousand Islands, 261, 262.
Three Brothers, 68.
Three Forks, 17, 21.
Thurston, L. A., 229.
Timber-line, 340–45; in Rocky Mountain National Park, 184, 185; the regions above, 345–51.
Tinkham, A. W., 158.
Tioga Pass, 92.
Tioga Road, 90, 96.
Tonto National Monument, 409.
Torrey's Peak, 330.
Trail, the, 388–93.
Trail Ridge, 180, 187.
Training of the Human Plant, The, quoted, 372, 373.
Trees, of Yellowstone Park, 51, 52; of Yosemite Park, 76–79; of Sequoia Park, 104–15; of Mt. Rainier, 129, 130; of Crater Lake Park, 145; of the Olympic Mts., 233, 234. *See also* Forest *and* Timber-line.
Triple Divide Peak, 156.
Trumbull, Walter, 5.
Tueeulala Falls, 86, 89.
Tumacacori National Monument, 406.
Tuolumne Cañon, 93.
Tuolumne Grove, 77.
Tuolumne Meadows, 88, 90, 92.
Tuolumne River, 66, 88, 93.
Tuolumne Valley, 90.
Twin Lakes, B.C., 412.
Twin Sister Peaks, 178, 188.
Two Ocean Glacier, 156.
Two Ocean Pass, 36, 155.
Two Ocean Pond, 36, 37.

Usnea, 128.

Valerian, 124.
Valley of the Ten Peaks, 412.
Vancouver, George, 120, 230.
Van Dyke, John C., quoted, 209, 210.
Van Trump, P. B., 121.
Vernal Falls, 85, 86, 453.
Victoria Glacier, 412.
Villard, Henry, 121, 122.
Volcanoes, in Yellowstone Park, 38, 39, 45, 46, 50; Mt. Rainier a sleeping volcano, 117, 126, 127; Mt. Mazama, 138–44; Lassen

Peak, 211–15; Cinder Cone, 216–18; Kilauea, 222–24; Mauna Loa, 222, 224–27; Haleakala, 222, 227, 228.
Vulture Peak, 156.

Wainwright, Alberta, 261.
Walhalla Plateau, 192, 193.
Walker, Joseph R., 94.
Walnut Cañon, 411.
Wapama Falls, 86, 89.
Warner Cañon, 214.
Washburn, Gen. Henry D., 26.
Washburn-Doane Expedition, 25, 26, 58.
Washington Column, 69.
Water-ouzel, *or* dipper, 313.
Waterton Lake, 149.
Waterton Lakes Park, description, 258–60; in table, 413.
Waterton River, 259.
Wawona tree, 78.
Waxwings, 312, 313.
Wheeler National Monument, 410.
White, Stewart Edward, quoted, 273, 274.
Wickersham, James, 250.
Wilbur Mountain, 149.
Wild Basin, 186.
Wind, pressure on waterfalls, 87; a high wind on Long's Peak, 320–22.
Wind Cave, 242, 243.
Wind Cave National Park, description, 242–44.
Winthrop, Theodore, 120; quoted, 120, 121, 128, 358, 359.
Winthrop Glacier, 133.
Wizard Island, 144, 145.
Wood, petrified, 45–50.
Woodcraft, suggestions, 335–38.
Yellowhead Pass, 253.
Yellowstone Cañon, 38, 39, 41.
Yellowstone Lake, 36, 40.
Yellowstone National Park, origin, 3–8; discoveries and explorations of the region, 10–27; Indian names for region, 11; geysers and springs, 28–35, 39; lakes, 36; streams, 36, 37; greatest attractions, 38; geology, 38–50; John Muir on, 42, 43; petrified forests, 45–50; area, 51; trees, 51, 52; wild flowers, 52; animal life, 53; entrances, 53; road-system, 54; administrative history, 54–58; experience of Truman C. Everts, 58–64; as a wild-life sanctuary, 305; improper feeding of bears in, 315; shipments of animals from, 315; act of dedication, 397–99; in table, 400.
Yellowstone River, 38, 41.
Yoho Park, description, 256–58; in table, 412.
Yoho Valley, 257.
Yosemite Creek, 86, 87.
Yosemite Falls, 69, 85–87.
Yosemite Flora, A, by H. M. and C. C. Hall, quoted, 82, 83.
Yosemite National Park, area and topography, 65; general features, 65–70; geology, 70–76; trees, 76–79; shrubs, 79; wild flowers, 79–83; waterfalls, 83–88; what to see in, 88–93; history, 93–98; in table, 401.
Yosemite Valley, 67–73, 75, 88, 94, 95, 97, 100.
Yosemite Village, 96.

BOSTON PUBLIC LIBRARY
3 9999 09874 720 5

YOUR NATIONAL PARKS

ENOS A. MILLS